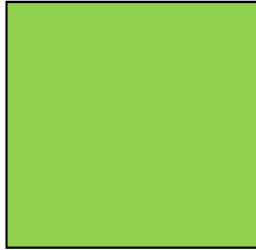
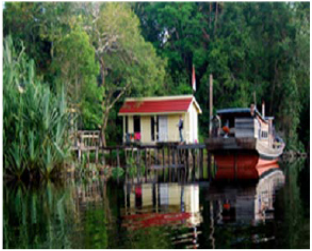
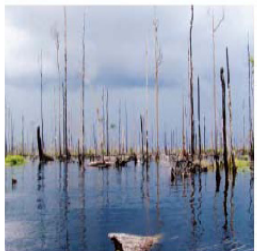
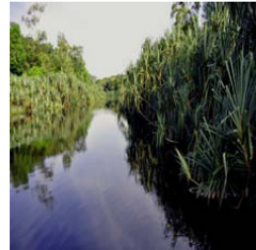
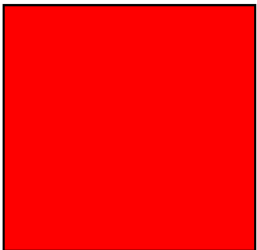


LAPORAN TAHUNAN
2011 - 2012

PRAKARSA KARBON BERBAK
Berbak Carbon Initiative



SEPTEMBER 2012





ZSL
LIVING CONSERVATION

**PRAKARSA KARBON BERBAK
(Berkak Carbon Initiative)
LAPORAN TAHUNAN**

OKTOBER 2011 – SEPTEMBER 2012

Disusun oleh:

**Erwin A Perbatakusuma, Mulya Shakti, Andjar Afristanto, Laura Darcy
Francisco Moga, Hayani Suprahman dan Ujang Solehuddin**

Zoological Society of London Indonesia

2012

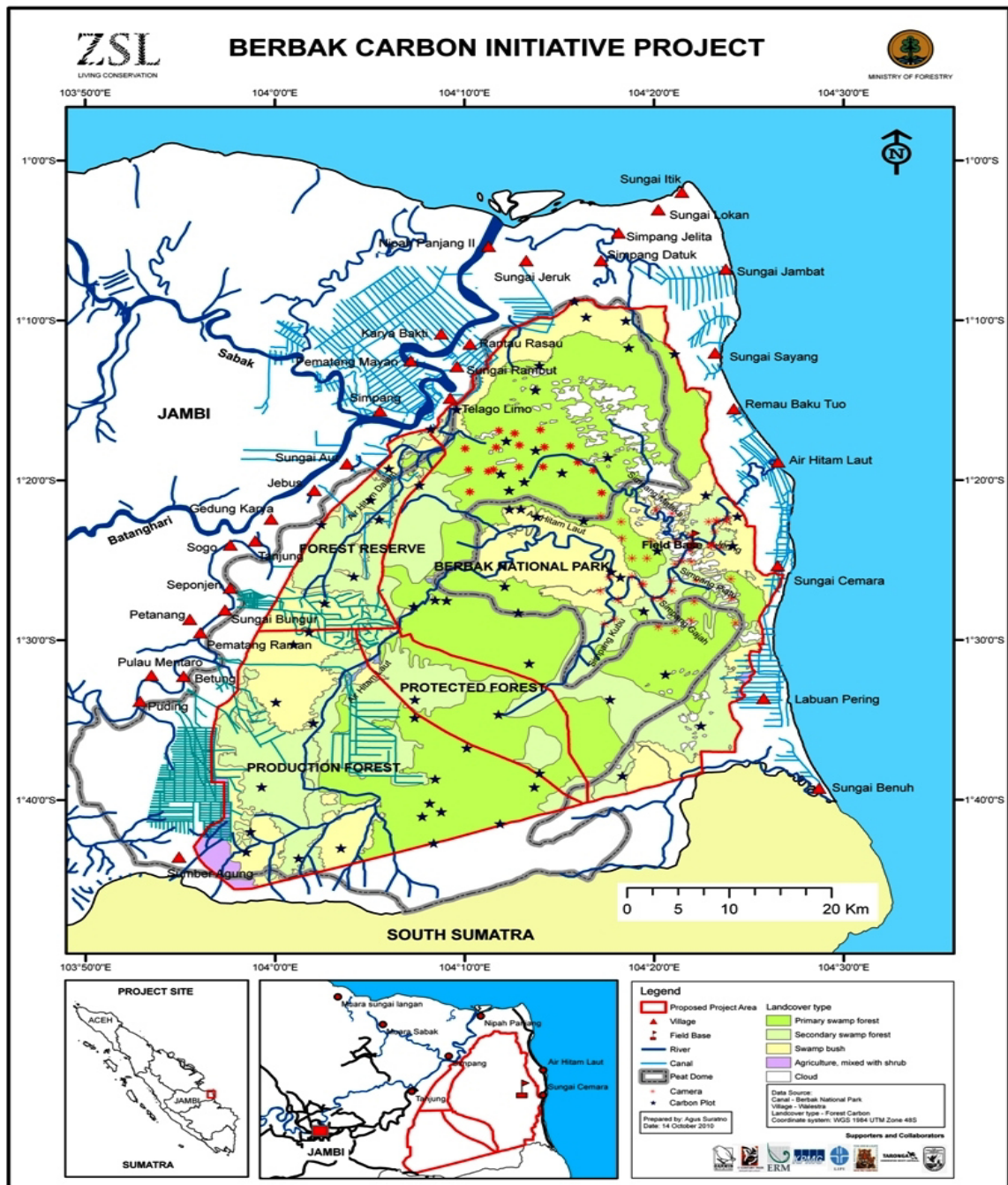
Risalah Eksekutif

Dokumen ini merupakan Laporan Kemajuan Tahun ke-1 Proyek Prakarsa Karbon Berbak disingkat PRO BERBAK (*Berbak Carbon Initiative*) untuk periode 12 Oktober 2011 sampai dengan 11 September 2012. Proyek PRO BERBAK, yang dilaksanakan di bawah kepemimpinan Zoological Society of London (ZSL) bekerjasama dengan Balai Taman Nasional Berbak Kementerian Kehutanan, dirancang untuk mendukung komitmen Pemerintah Indonesia dan Kementerian Kehutanan guna menurunkan emisi gas rumah kaca dari deforestasi dan degradasi hutan melalui pelestarian hutan dan lahan gambut yang kaya akan karbon, serta mendukung strategi pembangunan rendah emisi (*Low Emission Development Strategy/LED*).

Pelaksanaan PRO BERBAK didasari Perjanjian Kerjasama antara Balai Taman Nasional Berbak dengan ZSL No. SP 427/BTNB-1/2011 dan No. 26/BGR/X-2011 tertanggal 12 Oktober 2011 tentang Pelaksanaan Persiapan Program Pengurangan Emisi Karbon dari Deforestasi dan Degradasi Hutan (Program REDD+) di Taman Nasional Berbak Provinsi Jambi. Laporan disusun juga tidak terpisahkan dari Kesepakatan Kerjasama antara Balai Taman Nasional Berbak, Direktorat Pemanfaatan Jasa Lingkungan Hutan Konservasi dan Hutan Lindung dan Zoological Society of London pada tanggal 2 Desember 2011 tentang "*Rencana Kerja Lima Tahun (2011-2014) Pelaksanaan Persiapan Program Pengurangan Emisi Karbon dari Deforestasi dan Degradasi Hutan (Program REDD+ di Taman Nasional Berbak Provinsi Jambi)*". Periode pelaksanaan PRO BERBAK dimulai pada tanggal 12 Oktober 2011 sampai dengan 11 September 2014

PRO BERBAK berusaha untuk mengembangkan pendanaan jangka panjang bagi para pengelola unit pengelola hutan di Lansekap Berbak dalam mengurangi emisi karbon berbasis lahan dengan mengintegrasikan antara pelestarian hutan dan lahan gambut berikut keanekaragaman hayatinya dengan strategi pembangunan rendah emisi karbon. Sekitar 15 staf ZSL di Jakarta dan di kantor Jambi bekerja untuk mencapai tujuan tersebut melalui kemitraan dengan pemerintah daerah, lembaga penelitian, tokoh masyarakat dan organisasi non-pemerintah setempat. Proyek ini juga bekerja sama dengan mitra swasta di sektor kehutanan, perkebunan, serta organisasi masyarakat setempat untuk menyeimbangkan strategi pembangunan rendah emisi dengan pelestarian hutan dan lahan gambut.

Kegiatan PRO BERBAK dilakukan pada Bentang Alam Berbak seluas 238.000 hektar dengan Taman Nasional Berbak sebagai intinya dan juga mencakup Kawasan Penyangga Taman Nasional, yaitu Taman Hutan Raya Tanjung, Hutan Lindung Gambut Air Hitam Dalam dan Hutan Produksi. Secara administratif mencakup Kabupaten Muaro Jambi dan Tanjung Jabung Timur. Bentang Alam Berbak ini memiliki cadangan karbon yang tinggi dan menjadi habitat berbagai spesies liar endemik dan terancam punah secara global, khususnya jenis-jenis burung dan harimau Sumatera.



PETA 1. Lokasi Proyek Prakarsa Karbon Berbak Seluas 238,000 Hektar Mencakup Taman Nasional Berbak dan Kawasan Penyangganya, yaitu Hutan Lindung Gambut Air Hitam Dalam, Taman Hutan Raya Tanjung dan Hutan Produksi Terbatas

Pencapaian Penting PRO BERBAK Tahun Ke- 1

PRO BERBAK telah membuat langkah penting dalam mendorong dan memperkuat landasan teknis dan informasi ilmiah yang kokoh pada tataran bentang alam Berbak dalam mempersiapkan kondisi pemungkin (*enabling conditions*) guna menyongsong implementasi penuh kegiatan pengurangan emisi dari deforestasi dan degradasi hutan (*Reducing Emission from Deforestation and Degradation, REDD+*).

Sebagian besar kegiatan tahun pertama ditujukan melakukan proses pemilihan, perekrutan dan pelatihan bagi staf teknis dan staf lapangan yang akan bekerja, termasuk mitra kerja dari Balai TN. Berbak Kegiatan riset dan membangun infrastruktur riset telah menjadi fokus kegiatan pada tahun pertama guna membangun informasi ilmiah yang kokoh dalam rangka mempersiapkan data marka dasar (*base line*) emisi karbon hutan, biodiversitas dan sosial masyarakat.

Selain itu, staf PRO BERBAK bekerja untuk mensosialisasikan Proyek PRO BERBAK di tingkat bentang alam, membentuk kemitraan formal dan informal dengan pemerintah daerah, sektor swasta dan tokoh masyarakat untuk mendukung pelaksanaan Proyek PRO BERBAK di lapangan.

Tonggak penting (*project milestone*) berikut dibawah ini menandai pencapaian PRO BERBAK sampai tahun pertama:

- Terbangunnya Stasiun Riset Lapang dan Pondok Kerja Peneliti di Simpang Malaka.
- Tersedianya 1 (satu) unit kapal pompong untuk mempermudah akses ke lokasi penelitian di dalam TN. Berbak
- Terbangunnya Petak Sampling Permanen seluas 6 (enam) hektar untuk pelaksanaan kegiatan pemantauan fenologi hutan dan serasah hutan
- Tersesainya Laporan Penilaian Lapang Potensi REDD+ Pada Proyek Prakarsa Karbon Berbak oleh Forest Carbon Consultant.
- Dimulainya pengumpulan data karbon hutan dan biodiversitas, khususnya tumbuhan, satwa liar (mamalia, burung dan gibbon)
- Dimulainya dan berjalannya kegiatan penanganan konflik manusia dengan harimau Sumatera
- Tersusunnya dan ditandatangani Nota Kesepahaman Rencana Kerja Lima Tahunan antara ZSL dengan Direktorat Jasa Lingkungan Hutan Konservasi dan Hutan Lindung dan Balai Taman Nasional Berbak.

PRO BERBAK mengakhiri tahun ke-1 dengan membangun informasi dasar dan menciptakan landasan kerjasama yang lebih kokoh bagi kegiatan lapangan dan strategi terfokus untuk mengurangi emisi gas rumah kaca pada hutan gambut melalui integrasi konservasi hutan dan lahan gambut dengan strategi pembangunan rendah emisi. Berbagai sub-kontraktor dan mitra teknis telah menyediakan keahlian teknis dalam cakupan yang luas. PRO BERBAK berharap agar komitmen masyarakat terhadap konservasi dan mata pencaharian berkelanjutan serta

kerjasama para pihak yang kuat dapat bekerja sama untuk menjaga kelangsungan kegiatan PRO BERBAK di masa depan.

Tantangan dalam Pelaksanaan Proyek

PRO BERBAK merupakan proyek ambisius yang dilaksanakan dalam kondisi yang penuh tantangan serta melibatkan isu-isu yang sensitif secara politis di bentang alam terpencil seperti Bentang Alam Berbak.

Tantangan lain adalah REDD+ membutuhkan kepastian spasial untuk implementasi REDD+ secara penuh. Di Provinsi Jambi, Rencana Tata Ruang Wilayah Provinsi sebagai rujukan Rencana Tata Ruang Kabupaten kemantapan spasial belum tercipta. Hal ini disebabkan oleh kurangnya koordinasi antara pemerintah kabupaten dan provinsi tentang rencana tata ruang, sedangkan rencana tata ruang provinsi seringkali berorientasi spasial pembangunan infrastruktur yang mengancam kelestarian hutan dan lahan gambut. Hal ini diperparah dengan kurang tertibnya perijinan pemanfaatan lahan serta lemahnya penegakan hukum yang efektif yang diperlukan untuk menanggulangi konversi hutan dan lahan gambut yang terus berlangsung, serta kurangnya mekanisme pembiayaan alternatif yang dapat diandalkan untuk mengatasi pembukaan lahan bagi masyarakat, perkebunan kelapa sawit dan konsesi hutan tanaman industri, dan konsesi hutan alam

Sistematika Laporan Tahunan

Laporan Tahunan ini disajikan dalam tiga bab utama: Bab 1 menjelaskan arahan program kerjasama dan rencana kerja lima tahunan yang disepakati ZSL Indonesia, Balai Taman Nasional Berbak dan Direktorat PJLK2HL Kementerian Kehutanan BAB 2. memaparkan ringkasan perkembangan hasil-hasil yang telah diraih selama Tahun ke-1 berdasarkan Rencana Kerja Lima Tahun yang ditetapkan, dan memberikan ringkasan hasil keseluruhan indikator. Bab 3 memberikan ringkasan tentang tantangan implementasi pelaksanaan dan rencana prioritas pada Tahun Ke 2. Lampiran pada akhir laporan memaparkan rincian laporan teknis dan dokumentasi lainnya yang dihasilkan oleh PRO BERBAK sebagai sumber verifikasi pelaksanaan kegiatan. Laporan ini juga dilengkapi dengan Risalah Eksekutif.

BAB 1 :

ARAHAN PROGRAM DAN RENCANA KERJA LIMA TAHUNAN

Arahan program Pelaksanaan Persiapan Program Pengurangan Emisi Karbon dari Deforestasi dan Degradasi Hutan (Program REDD+) di Taman Nasional Berbak Provinsi Jambi secara umum memiliki tujuan akhir untuk melestarikan keanekaragaman hayati, potensi karbon dan ekosistem hutan rawa gambut di TN.Berbak. Selain itu juga diharapkan mendapatkan manfaat untuk menciptakan insentif keuangan melalui skema REDD+ bagi pengelola lansekap Taman Nasional Berbak dan unit pengelola hutan lainnya untuk melestarikan habitat rawa gambut yang mengandung keanekaragaman hayati dan potensi karbon dan jasa lingkungan esensial lainnya. Adapun tujuan akhir tersebut dicapai melalui output yang dijabarkan dalam 6 (enam) output yang akan dicapai. Adapun Indikator kinerja dan alat verifikasi dari masing-masing indikator serta output-output tersebut dapat dijelaskan sebagaimana diuraikan pada Tabel 1 dibawah ini:

TABEL 1. ARAHAN PROGRAM, INDIKATOR KINERJA DAN ALAT VERIFIKASI

NARATIF ARAHAN PROGRAM	INDIKATOR KINERJA/HASIL PENCAPAIAN	ALAT VERIFIKASI
<u>TUJUAN AKHIR:</u> Melestarikan keaneka ragam hayati, potensi karbon dan ekosistem hutan rawa gambut di TN.Berbak	<ol style="list-style-type: none">1. Tingkat deforestasi secara signifikan berkurang2. Tingkat emisi karbon berkurang signifikan melalui intervensi kegiatan pengurangan emisi3. Populasi spesies kunci stabil atau meningkat4. Pemerintah daerah dan masyarakat lokal menunjukkan peningkatan dukungan bagi konservasi Taman Nasional Berbak	Laporan pemantauan karbon berbasis sistem satelit Laporan pemantauan karbon dan inventarisasi hutan berbasis petak sampling permanen Laporan penilaian dan pengelolaan kebocoran karbon hutan Laporan tahunan penilaian keanekaragaman hayati Laporan survei ekonomi komunitas lokal pada awal dan akhir proyek Laporan KAP (Knowledge, Attitude, Perception) pada awal dan diakhir proyek

NARATIF ARAHAN PROGRAM	INDIKATOR KINERJA/HASIL PENCAPAIAN	ALAT VERIFIKASI
<p><u>TUJUAN :</u></p> <p>Menciptakan insentif keuangan melalui skema REDD+ bagi pengelola lansekap Taman Nasional Berbak untuk melestarikan habitat rawa gambut yang mengandung keanekaragaman hayati dan potensi karbon dan jasa lingkungan esensial lainnya</p>	<ol style="list-style-type: none"> 1. Terbukti ketersediaan ekonomis volume karbon untuk pengurangan emisi 2. Nilai cadangan karbon, proyeksi dan potensi pengurangan emisi CO₂e didapatkan 	<p>Laporan studi kelayakan ekonomi karbon terselesaikan oleh pihak ketiga</p> <p>Laporan penilaian cadangan, proyeksi dan potensi karbon terselesaikan</p>
<p><u>OUTPUT 1:</u></p> <p>Pembentukan kelembagaan kolaboratif berbasis para pihak dan kerangka kerjasama serta modeling MRV yang dibutuhkan untuk mengoperasikan pendapatan ekonomi berbasis karbon</p>	<ol style="list-style-type: none"> 1. Organisasi multi-pihak pelaksana REDD+ terbentuk 2. Penyusunan Keputusan Dini Tanpa Paksaan Berdasarkan Informasi Lengkap Sejak Awal (Free Prior and Informed Consent /FPIC) terhadap Proyek REDD+ terbangun 3. Rancang Disain Proyek REDD+ Voluntary Carbon Standard (VCS) dituliskan 4. Pendaftaran Proyek REED+ 5. Rancang Disain Proyek REDD+ Climate Community Biodiveristy Standar (CCBS) dituliskan 6. Validasi dan sertifikasi Dokumen Rancang Disain VSC 7. Validasi dan sertifikasi Dokumen Rancang Disain CCBS 8. Ada lembaga pembeli dan di pasar voluntary atau mandatory yang membeli atau memberikan insentif keuangan 'emisi karbon Berbak' 	<p>Struktur dan fungsi organisasi pelaksana REDD+, legal, disetujui dan fungsional</p> <p>Dokumen FPIC, disetujui dan disepakati. Masyarakat menerima pendekatan REDD+ sebagai salah satu strategi konservasi alam dan peningkatan sumber penghidupan masyarakat.</p> <p>Dokumen Final Rancang Disain REDD+ VSC terselesaikan</p> <p>Proyek REDD+ terdaftar diketahui dan diakui</p> <p>Dokumen Final Rancang Disain REDD+ CBBS terselesaikan</p> <p>Sertifikat VSC diperoleh</p> <p>Sertifikat CCBS peringkat emas diperoleh</p> <p>Bukti transaksi tersedianya dana untuk membiayai rencana kegiatan penurunan emisi tersedia</p>

NARATIF ARAHAN PROGRAM	INDIKATOR KINERJA/HASIL PENCAPAIAN	ALAT VERIFIKASI
<p><u>OUTPUT 2 :</u></p> <p>Kuantifikasi nilai marka dasar (base line) emisi dan laju perubahannya dalam skenario `bisnis seperti biasanya`</p>	<ol style="list-style-type: none"> 1. Perubahan tutupan hutan dalam 10 tahun terakhir di seluruh wilayah proyek dinilai dan dianalisis 2. Nilai karbon dikalibrasi minimum 100 petak sampling di lapangan dan didasarkan 30 Petak Sampling Permanen (PSP) dikalkulasi 3. Kedalaman dan panjang kanal di sekitar TN.Berbak dianalisis dan dipetakan 4. Pengaruh manusia dan pemukiman di dalam hutan dianalisis 5. Penentuan jarak buffer pendorong deforestasi dianalisis dan dipetakan 6. Tingkat pengambilan kayu dari penebangan kayu ilegal dianalisis 7. Biomassa dan nilai karbon berbasis lapangan Tier 3 dihitung dan dianalisis 8. Model emisi : `business as usual` dimutakhirkan berdasarkan data terbaru 9. Kelayakan harga untuk pembelian kawasan hutan produksi di kawasan penyangga TN Berbak diinvestigasi dan dianalisis 10. Deforestasi terencana oleh pemerintah regional diinvestigasi 11. Rincian kegiatan pengurangan emisi , reduksi emisi, ketersediaan metodologi verifikasi dan biaya dihitung dan dianalisis 	<p>Laporan proyek dan peta tematik diselesaikan</p> <p>Laporan penilaian diselesaikan</p> <p>Laporan dan peta diselesaikan</p> <p>Laporan penilaian diselesaikan</p> <p>Laporan penilaian diselesaikan</p> <p>Laporan penilaian diselesaikan</p> <p>Laporan penilaian diselesaikan</p> <p>Laporan penilaian diselesaikan</p> <p>Laporan penilaian diselesaikan</p> <p>Laporan penilaian proyek diselesaikan</p> <p>Laporan penilaian diselesaikan</p>

NARATIF ARAHAN PROGRAM	INDIKATOR KINERJA/HASIL PENCAPAIAN	ALAT VERIFIKASI
<p><u>OUTPUT 3 :</u></p> <p>Kuantifikasi nilai marka dasar (base line) ko-manfaat (keanekaragaman hayati, masyarakat) dan hubungan dengan nilai marka dasar karbon</p>	<ol style="list-style-type: none"> 1. Keanekaragaman hayati (satwa harimau, burung, gibbon) setidaknya berdasarkan 100 petak sampling dinilai dan dianalisis 2. Sosial ekonomi komunitas lokal minimal 30 % populasi penduduk dinilai dan dianalisis 	<p>Laporan penilaian diselesaikan</p> <p>Laporan penilaian diselesaikan</p>
<p><u>OUTPUT 4:</u></p> <p>Penilaian viabilitas strategi intervensi yang tersedia untuk pengurangan emisi dan penyerapan karbon serta adaptasi iklim</p>	<ol style="list-style-type: none"> 1. Setidaknya-tidaknya 5 (lima) potensi intervensi strategi pengurangan emisi dan penyerapan karbon diperiksa 2. Setidaknya-tidaknya 5 (lima) potensi intervensi strategi adaptasi iklim diperiksa 	<p>Laporan penilaian diselesaikan</p> <p>Laporan penilaian diselesaikan</p>
<p><u>OUTPUT 5 :</u></p> <p>Terlaksananya strategi dan rencana-rencana kegiatan penurunan emisi CO₂e</p>	<ol style="list-style-type: none"> 1. Sekurang-kurangnya deforestasi tahunan sebesar -1,14% dicegah 2. Sekurang-kurangnya 33 juta ton CO₂e potensi emisi karbon selama 30 tahun atau setara dengan 1,1 juta ton CO₂e, khususnya dari pengeringan rawa dan oksidasi di rawa gambut dalam TN Berbak dihindari /dicegah 3. Produksi kredit emisi karbon bersih yang terverifikasi selama 30 tahun dari kegiatan pembasahan kembali dan konservasi rawa serta kegiatan penghindaran deforestasi mosaik tidak terencana sebesar 17,98 juta ton CO₂e dalam kondisi stabil 4. Nilai pasar kredit emisi karbon bersih yang terverifikasi selama 30 tahun dari kegiatan pembasahan kembali dan konservasi rawa serta kegiatan penghindaran deforestasi mosaik tidak terencana sebesar 167,3 juta USD dalam kondisi stabil 	<ol style="list-style-type: none"> 1. Keputusan Menteri Izin Usaha Pemanfaatan jasa Lingkungan Karbon di Kawasan Konservasi 2. Bukti transaksi pembelian emisi karbon terverifikasi 3. Laporan pemantauanutupan hutan pada akhir proyek implementasi proyek REDD 4. Laporan pemantauan karbon berbasis sistem satelit pada akhir proyek implementasi proyek REDD 5. Laporan penilaian dan pengelolaan kebocoran karbon hutan pada akhir implementasi proyek REDD 6. Laporan pemantauan karbon dan inventarisasi hutan berbasis petak sampling permanen pada akhir implemementasi proyek REDD

NARATIF ARAHAN PROGRAM	INDIKATOR KINERJA/HASIL PENCAPAIAN	ALAT VERIFIKASI
	<p>5. Kegiatan perlindungan/pengamanan kawasan untuk mengurangi deforestasi tidak terencana seperti penebangan liar dan perburuan satwa liar dilaksanakan</p> <p>6. Kegiatan perlindungan untuk mengurangi deforestasi tidak terencana dengan mengurangi dan menghentikan perambahan hutan untuk pertanian dilaksanakan bersama masyarakat</p> <p>7. Penutupan kanal dan pembasahan kembali dan konservasi hutan rawa bersama masyarakat dilaksanakan</p> <p>8. Infrastruktur pencegahan kebakaran hutan dan tim pemadaman api diadakan dan difungsikan</p> <p>9. Restorasi kawasan hutan gambut eks terbakar di dalam TN Berbak dengan jenis lokal cepat tumbuh dilaksanakan</p>	<p>1. Laporan operasi patrol 2. Barang bukti operasi 3. Jumlah kegiatan pengurangan deforestasi tidak terencana (unplanned deforestation)</p> <p>1. Jumlah perambah dan luasan perambahan yang berhasil dikurangi 2. Jumlah kegiatan pengurangan deforestasi tidak terencana (unplanned deforestation) 3. Jumlah keluarga petani yang melaksanakan kegiatan alternatif ekonomi berwawasan lingkungan</p> <p>1. Jumlah kanal yang ditutup 2. Peningkatan tinggi permukaan air rawa gambut 3. Luasan lahan gambut yang dibasahi kembali dan dikonservasi</p> <p>1. Luasan kawasan hutan yang dapat dicegah dari kebakaran 2. Luas kebakaran hutan yang dapat dipadamkan 3. Jumlah tim pemadam api yang berfungsi</p> <p>1. Luasan kawasan yang direstorasi 2. Jumlah bibit yang berhasil tumbuh menjadi anakan</p>

NARATIF ARAHAN PROGRAM	INDIKATOR KINERJA/HASIL PENCAPAIAN	ALAT VERIFIKASI
<p><u>OUTPUT 6 :</u></p> <p>Kesinambungan pelaksanaan kegiatan pengurangan emisi dicapai dan berjalan efektif</p>	<ol style="list-style-type: none"> 1. Pemantauan cadangan karbon, keanekaragaman hayati dan persepsi masyarakat dilaksanakan 2. Hasil penjualan karbon didistribusikan tepat waktu ke semua tingkatan untuk membiayai kegiatan pengurangan emisi 3. Pemantauan kemajuan kegiatan 4. Evaluasi kegiatan tahunan 5. Publikasi dan kertas kerja kebijakan 6. Pertemuan koordinasi pemangku kepentingan dilaksanakan 7. Pertemuan koordinasi pusat dan daerah dilaksanakan 8. Verifikasi pelaksanaan kegiatan-kegiatan pengurangan emisi CO₂e 	<ol style="list-style-type: none"> 1. Laporan pemantauan karbon, biodiversitas dan masyarakat diselesaikan 1. Laporan finansial dibuat dengan standar tinggi dan diselesaikan tepat waktu dan diaudit 1. Laporan kemajuan 6 bulanan diselesaikan dan didistribusikan untuk perbaikan pelaksanaan program 1. Laporan evaluasi kegiatan diselesaikan dan didistribusikan untuk menilai pencapaian pelaksanaan program 1. Barang cetakan, didistribusikan kepada para pihak untuk pengembangan kebijakan REDD+ di kawasan konservasi rawa gambut 1. Notulen pertemuan, daftar absen peserta 1. Notulen pertemuan, daftar absen peserta 1. Laporan validasi pihak ketiga 2. Sekurang-kurangnya 1,1 juta emisi CO₂e dapat dicegah setiap tahunnya di TN. Berbak

Selanjutnya, arahan program dan rencana operasional yang telah dibuat dijabarkan dalam rencana kerja lima tahunan yang diuraikan sebagaimana Tabel 2. Rencana Kerja Lima Tahun merupakan penjabaran dari arahan program dan rencana operasional yang disusun sebagai

penjabaran Memorandum Saling Pengertian yang telah ditanda-tangani pada tanggal 30 Mei 2011, antara Direktur Jenderal Perlindungan Hutan dan Konservasi Alam (PHKA) Kementerian Kehutanan dengan Direktur Program Asian Selatan dan Tenggara, Zoological Society of London dalam rangka pelaksanaan konservasi spesies terancam punah dan habitatnya, khususnya pada ruang lingkup kegiatan pengembangan kegiatan konservasi habitat satwa liar prioritas terancam kepunahannya melalui program pemanfaatan penyerapan dan penyimpanan karbon.

Sedangkan tujuannya adalah untuk menjabarkan program-program yang akan dijabarkan dalam setiap tahunnya dalam rangka meningkatkan upaya pemanfaatan jasa lingkungan melalui pelaksanaan pembuatan lokasi percontohan (DA's) REDD+ dan paralel dengan pelaksanaan pembinaan habitat satwa utamanya jenis harimau Sumatera di kawasan konservasi hutan rawa gambut, khususnya di Taman Nasional Berbak Provinsi Jambi yang terdaftar dan diketahui oleh Kementerian Kehutanan.

TABEL 2. Rencana Kerja Lima Tahunan

PROGRAM DAN NARATIF ARAHAN PROGRAM	INDIKATOR KINERJA/HASIL PENCAPAIAN	URAIAN KEGIATAN	TAHUN				
			I	II	III	IV	V
A. KELEMBAGAA N, VALIDASI DAN MRV OUTPUT 1: Pembentukan kelembagaan kolaboratif berbasis para pihak dan kerangka kerjasama yang dibutuhkan untuk mengoperasikan pendapatan ekonomi berbasis karbon	1. Penyusunan Keputusan Dini Tanpa Paksaan Berdasarkan Informasi Lengkap Sejak Awal (Free Prior and Informed Consent /PPIC) terhadap Proyek REDD+ terbangun	1. Melakukan sosialisasi program tingkat desa, kecamatan, kabupaten dan provinsi 2. Mendorong pembuatan Dokumen PPIC, yang disetujui dan disepakati	X	X			
	2. Organisasi multi-pihak pelaksana REDD+ terbentuk	1. Membentuk kelembagaan dengan melibatkan para pemangku kepentingan			X		
	9. Rancang Disain Proyek (PDD) REDD+ Voluntary Carbon Standard (VCS) dituliskan	1. Penulisan PDD REDD - VSC		X	X	X	
	10. Pendaftaran Proyek REED+	1. Melakukan registrasi proyek REDD di DitPJK2HL			X		

PROGRAM DAN NARATIF ARAHAN PROGRAM	INDIKATOR KINERJA/HASIL PENCAPAIAN	URAIAN KEGIATAN	TAHUN					
			I	II	III	IV	V	
	11. Rancang Disain Proyek REDD+ Climate Community Biodiveristy Standar (CCBS) dituliskan 12. Validasi dan sertifikasi Dokumen Rancang Disain VSC 13. Validasi dan sertifikasi Dokumen Rancang Disain CCBS 14. Ada lembaga pembeli dan di pasar voluntary atau mandatory yang membeli atau memberikan insentif keuangan 'emisi karbon Berbak'	1. Penulisan PDD REDD+ CCBS 2. Melakukan validasi PDD VSC 3. Melakukan validasi PDD CCBS 1. Melakukan penawaran dan negosiasi dengan pihak investor/pembeli kredit karbon			X	X	X	X
B. MARKA DASAR KARBON OUTPUT 2 : Kuantifikasi nilai marka dasar (base line) emisi dan laju perubahannya dalam skenario `bisnis	1. Perubahan tutupan hutan dalam 10 tahun terakhir di seluruh wilayah proyek dinilai dan dianalisis 2. Niai karbon dikalibrasi minimum 100 petak sampling di lapangan dan didasarkan 30 Petak Sampling Permanen (PSP)	1. Melakukan anáalisis perubahan penutupan hutan selama 10 tahun terakhir 1. Melakukan survei potensi karbon di petak yang telah ditetapkan dan menentukan Permanen Petak Sampling	X	X				
			X	X				

PROGRAM DAN NARATIF ARAHAN PROGRAM	INDIKATOR KINERJA/HASIL PENCAPAIAN	URAIAN KEGIATAN	TAHUN					
			I	II	III	IV	V	
	dikalkulasi							
	3. Kedalaman dan panjang kanal di sekitar TN.Berbak dianalisis dan dipetakan	1. Melaksanakan survei dan analisis panjang kanal yang berada di sekitar TN berbak dan di dalam kawasan TN Berbak		X				
	4. Pengaruh manusia dan pemukiman di dalam hutan dianalisis	1. Melakukan survei dan analisis sosial ekonomi masyarakat	X	X				
	5. Penentuan jarak buffer pendorong deforestasi dianalisis dan dipetakan	1. Melakukan survei dan analisis jarak buffer pendorong deforestrasi kawasan TN Berbak	X	X				
	6. Tingkat pengambilan kayu dari penebangan kayu ilegal dianalisis	1. Melakukan investigasi dan analisis kegiatan illegal logging dan tingkat pengambilan kayu di dalam kawasan TN Berbak	X	X				
	7. Biomassa dan nilai karbon berbasis lapangan Tier 3 dihitung dan dianalisis	1. Melaksanakan survei biomasa hutan gambut dibawah dan diatas permukaan tanah	X	X				
	8. Model emisi : 'business as usual' dimutakhirkan berdasarkan data terbaru	1. Melakukan pemodelan proyeksi emisi pada skenario 'business as usual'		X				
	9. Kelayakan harga untuk pembelian kawasan hutan produksi di kawasan	1. Melakukan analisis kelayakan harga untuk membeli konsesi kawasan hutan produksi di kawasan penyangga Taman Nasional		X				

PROGRAM DAN NARATIF ARAHAN PROGRAM	INDIKATOR KINERJA/HASIL PENCAPAIAN	URAIAN KEGIATAN	TAHUN				
			I	II	III	IV	V
	penyangga TN Berbak diinvestigasi dan dianalisis 10 Deforestasi terencana oleh pemerintah regional diinvestigasi 10. Rincian kegiatan pengurangan emisi , reduksi emisi, ketersediaan metodologi verifikasi dan biaya dihitung dan dianalisis	1. Melakukan survei dan analisis terhadap pengembangan wilayah yang menyebabkan terjadinya deforestasi terencana. 1. Melaksanakan studi kepustakaan dan analisis terhadap kegiatan-kegiatan reduksi emisi		X	X		
C. MARKA DASAR KO-BENEFIT BIODIVERSITAS DAN MASYARAKAT OUTPUT 3 : Kuantifikasi nilai marka dasar (base line) ko-manfaat (keanekaragaman hayati, masyarakat) dan hubungan dengan nilai marka dasar karbon	1. Keanekaragaman hayati (satwa harimau, burung, gibbon) setidaknya berdasarkan 100 petak sampling dinilai dan dianalisis 2. Sosial ekonomi Komunitas lokal minimal 30 % populasi penduduk dinilai	1. Mengadakan infrastruktur riset 2. Melakukan monitoring keberadaan dan populasi harimau Sumatera dan satwa pemangsa serta habitatnya melalui jebakan kamera 3. Melakukan survei keberadaan dan populasi primata gibbon 4. Melakukan survei keanekaragaman hayati burung 5. Melakukan monitoring fenologi hutan dan serasah hutan 1. Melakukan inventarisasi dan pengumpulan data dasar sosial masyarakat di sekitar TN. Berbak 2. Melakukan kajian persepsi dan	X X	X X	X X		

PROGRAM DAN NARATIF ARAHAN PROGRAM	INDIKATOR KINERJA/HASIL PENCAPAIAN	URAIAN KEGIATAN	TAHUN				
			I	II	III	IV	V
	dan dianalisis	kebutuhan ekonomi masyarakat pada desa fokus pengembangan 3. Melakukan perencanaan konservasi partisipatif pada 7 desa fokus		X	X		
D. VIABILITAS STRATEGI PENGURANGAN EMISI OUTPUT 4: Penilaian viabilitas strategi intervensi yang tersedia untuk pengurangan emisi dan penyerapan karbon serta adaptasi iklim	. 1. Setidak-tidaknya 5 (lima) potensi intervensi strategi pengurangan emisi dan penyerapan karbon diperiksa 2. Setidak-tidaknya 5 (lima) potensi intervensi strategi adaptasi iklim diperiksa	1. Melakukan studi anda analisis potensi strategi pengurangan emisi 1. Melakukan studi anda analisis potensi strategi adaptasi iklim		X	X		
E. IMPLEMENTASI KEGIATAN PENGURANGAN EMISI OUTPUT 5 : Terlaksananya strategi dan rencana-rencana kegiatan penurunan emisi CO ₂ e	. 1. Kegiatan perlindungan/pengamanan kawasan untuk mengurangi deforestasi tidak terencana seperti penebangan liar dan perburuan satwa liar dilaksanakan	1. Melaksanakan kegiatan perlindungan kawasan untuk mengurangi deforestasi tidak terencana seperti penebangan liar dan perburuan satwa liar	X	X	X	X	X

PROGRAM DAN NARATIF ARAHAN PROGRAM	INDIKATOR KINERJA/HASIL PENCAPAIAN	URAIAN KEGIATAN	TAHUN				
			I	II	III	IV	V
	2. Kegiatan perlindungan untuk mengurangi deforestasi tidak terencana dengan mengurangi dan menghentikan perambahan hutan untuk pertanian dilaksanakan bersama masyarakat	1. Melaksanakan kegiatan perlindungan kawasan untuk mengurangi deforestasi tidak terencana seperti penebangan liar dan perburuan satwa liar				X	X
	3. Penutupan kanal dan pembasahan kembali dan konservasi hutan rawa bersama masyarakat dilaksanakan	1. Melaksanakan kegiatan penutupan kanal bersama masyarakat sekitar TN. Berbak			X	X	X
	4. Infrastruktur pencegahan kebakaran hutan dan tim pemadam api diadakan dan difungsikan	1. Mengadakan sarana dan prasarana kebakaran hutan rawa gambut				X	X
	5. Restorasi kawasan hutan gambut eks terbakar di dalam TN Berbak dengan jenis lokal cepat tumbuh dilaksanakan	1. Melakukan penanaman kembali kawasan bekas kebakaran di dalam Taman Nasional dengan jenis-jenis pohon local dan toleran terhadap lahan basah				X	X

PROGRAM DAN NARATIF ARAHAN PROGRAM	INDIKATOR KINERJA/HASIL PENCAPAIAN	URAIAN KEGIATAN	TAHUN				
			I	II	III	IV	V
F. MONITORING DAN EVALUASI OUTPUT 6 : Kestinambungan pelaksanaan kegiatan pengurangan emisi dicapai dan berjalan efektif	1. Pemantauan cadangan karbon, keanekaragaman hayati dan persepsi masyarakat dilaksanakan	1. Melaksanakan pemantauan karbon di petak sampling permanen			X	X	X
		2. Melaksanakan pemantauan biodiversitas kunci (harimau, burung dan primata gibbon)			X	X	X
		3. Melaksanakan studi KAP (Knowledge, Attitude dan Perception)					X
	2. Hasil penjualan karbon didistribusikan tepat waktu ke semua tingkatan untuk membiayai kegiatan pengurangan emisi	1. Melakukan distribusi manfaat hasil penjualan karbon				X	X
		1. Menyusun laporan kemajuan tahunan	X	X	X	X	X
	3. Pemantauan kemajuan kegiatan	1. Menyusun laporan evaluasi tahunan	X	X	X	X	X
		4. Evaluasi kegiatan tahunan	X	X	X	X	X
	5. Publikasi dan kertas kerja kebijakan	1. Merancang, mencetak dan mendistribusikan lembaran informasi proyek (leaflet, booklet)			X	X	X
		2. Menyusun dan mempresentasikan kertas kerja kebijakan REDD di			X	X	X

PROGRAM DAN NARATIF ARAHAN PROGRAM	INDIKATOR KINERJA/HASIL PENCAPAIAN	URAIAN KEGIATAN	TAHUN				
			I	II	III	IV	V
		kawasan konservasi rawa gambut					
	6. Pertemuan koordinasi pemangku kepentingan dilaksanakan	1. Melakukan pertemuan koordinasi 6 bulanan	X	X	X	X	X
	7. Pertemuan koordinasi pusat dan daerah dilaksanakan	2. Melakukan pertemuan koordinasi 6 bulanan	X	X	X	X	X
	8. Verifikasi pelaksanaan kegiatan-kegiatan pengurangan emisi CO ₂ e	1. Melaksanakan kegiatan verifikasi oleh pihak independen untuk membuktikan sekurang-kurangnya 1,1 juta emisi CO ₂ e apat dicegah setiap tahunnya				X	X

BAB 2 :

PERKEMBANGAN PELAKSANAAN KEGIATAN

KOMPONEN KEGIATAN : Kelembagaan, MRV dan Validasi

OUTPUT PROYEK 1: *Pembentukan kelembagaan kolaboratif berbasis para pihak dan kerangka kerjasama yang dibutuhkan untuk mengoperasikan pendapatan ekonomi berbasis karbon*

Salah satu kegiatan yang telah dilaksanakan pada tahun pertama adalah melakukan sosialisasi Proyek PRO BERBAK dan Program REDD+ pada desa-desa yang berbatasan dengan TN. Berbak untuk mengetahui sejak awal aspirasi dan rencana masyarakat lokal untuk terlibat dan bekerjasama dalam Program REDD+. Kegiatan ini dilaporkan secara detail dapat dilihat pada Lampiran 1 dan Lampiran 7.

KOMPONEN KEGIATAN : MARKA DASAR KARBON

OUTPUT 2 : *Kuantifikasi nilai marka dasar (base line) emisi karbon dan laju perubahannya dalam skenario ' bisnis seperti biasanya (Business As Usual)*

Berdasarkan hasil kajian yang dilakukan oleh ZSL dan Forest Carbon pencapaian output 2 telah diselesaikan Secara detail dapat disimak dalam laporan berjudul "*Initial Field and Desktop Assessment of Carbon Emission Reduction Potential for the Berbak Carbon Initiative Jambi Province Sumatra, Indonesia*". Dan secara ringkas dijelaskan sebagai berikut:

1. Historis dan Laju Deforestasi

Informasi historis tingkat referensi karbon hutan diketahui dengan terlebih dahulu melakukan pengkajian tingkat perubahan tutupan hutan historis berbasis citra satelit. Peta citra satelit yang digunakan untuk menghitung sejarah penebangan hutan historis dan memvalidasi model potensial. Sejarah deforestasi dikalkulasi dengan menggunakan peta citra satelit dengan resolusi dengan ketelitian 28,5 meter pada peta citra Landsat 7 (L7) tahun 1990, 2000 dan 2005. Data validasi termasuk peta tahun 2008 untuk daerah rujukan dan tahun 2009 untuk wilayah Bentang Alam Hutan Gambut Berbak. Data tutupan hutan diinterpretasikan dari peta citra Advanced Land Observing Satellite (ALOS) dengan resolusi 50 meter.

Hasil analisis dengan menggunakan peta Citra Landsat TM tahun 1990 sampai 2005 dan Peta Citra Satelit ALOS sampai dengan tahun 2009, menunjukkan laju deforestasi adalah 2% setiap tahunnya di seluruh Hutan Rawa Gambut Berbak. Nilai ini setara dengan laju deforestasi nasional yang juga mencapai 2% per-tahun. Tetapi, ditemukan kawasan dengan laju deforestasi mencapai 4% seperti yang terjadi di Taman Hutan Raya Tanjung yang berbatasan dengan Taman Nasional Berbak. Deforestasi di Taman Nasional Berbak diperkirakan dimulai antara tahun 2000. Bahkan deforestasi semakin luas pada periode 2000 yang diakibatkan kebakaran hutan di Taman Nasional, khususnya di bagian tengah kawasan TNB. Tingkat laju deforestasi di Kawasan TN. Berbak sebesar -1,14%, nilai

ini kecil dibandingkan dengan tingkat deforestasi di kawasan-kawasan hutan sekitar TN. Berbak, di Kawasan Hutan Produksi Terbatas laju deforestasi mencapai -2,43% dan di Kawasan Taman Hutan Raya laju deforestasi mencapai - 3,03% serta nilai laju deforestasi ini lebih besar dibandingkan laju deforestasi di Kawasan Hutan Lindung Gambut dengan nilai - 0,75%. Pada Tabel 2 ditunjukkan secara historis perubahan tutupan hutan berikut laju deforestasinya.

2. Cadangan dan Emisi Karbon Hutan

Analisis cadangan karbon hutan di bentang alam hutan gambut Berbak, termasuk wilayah TN. Berbak telah dilakukan dengan menggunakan pendekatan tingkat kerincian 1 (Tier-1) mengacu pada Pedoman IPCC GPG-LULUCF dan menggunakan data dari World Resources Institute pada tahun 2007. Data WRI berasal oleh Gibbs, Brown dan Olson et al (2009).

Hasil analisis menyimpulkan bahwa TN. Berbak mengandung cadangan karbon 25.998.500 ton C dengan rata-rata 0 – 225 ton C per-hektar dan emisi karbon ~ 95,988,500 ton CO₂e. Nilai cadangan karbon ini tertinggi dibandingkan dengan kandungan emisi karbon hutan di kawasan-kawasan hutan yang berdampingan dengan TN. Berbak, seperti Hutan Lindung Gambut, Taman Hutan Raya dan Hutan Produksi Terbatas. Data ini juga memperlihatkan bahwa TN. Berbak mempunyai kontribusi paling penting dalam mitigasi perubahan iklim dibandingkan dengan kawasan-kawasan hutan sekitarnya. Lihat Tabel 4 dan Peta 3.

2. Baseline Emisi Karbon

Berdasarkan data historis deforestasi 20 tahun terakhir di TN. Berbak, marka dasar dan proyeksi telah ditentukan melalui analisis pemodelan dengan menggunakan pendekatan Transisi LCM (*Land Cover Change Moduler*). Metodologi ini telah dapat memastikan faktor-faktor penting yang berpengaruh dalam menentukan prediksi ancaman deforestasi kedepan pada skenario bisnis seperti biasa (Business as Usual) dan nilai proyeksi emisinya. Merujuk data historis deforestasi di TN Berbak ditemukan informasi yang menarik. Di bagian tengah Taman Nasional Berbak, kawasan terbuka mulai terjadi pada tahun 2000. Ancaman gangguan manusia ke wilayah tersebut terdeteksi dalam peta tahun 1990 dengan adanya noktah-noktah kecil, akibat terjadinya penggundulan hutan, meskipun pada saat itu belum terjadi kebakaran hutan yang luas. Selanjutnya deforestasi di sekitar tepi Taman Nasional berbak, akibat kebakaran hutan yang terjadi pada kurun waktu tahun 2000 sampai 2005 dan sampai tahun 2009. Apakah deforestasi ini didorong sebagai akibat kebakaran tambahan atau pembalakan liar masih belum jelas. Hal itu memerlukan analisis lebih lanjut dan pemantauan lebih lanjut di lapangan. Hal ini tersaji pada Peta 2 dan Tabel 3 berikut dibawah ini.

Metodologi Tier 3 (*tingkat kerincian 3*) dalam menilai emisi karbon hutan lebih akurat telah digunakan dalam perancangan skema REDD+ di TN. Berbak. Pendekatan Tier 3 dilakukan dengan mengkombinasikan penghitungan berbasis citra satelit dengan penilaian biomassa hutan di lapangan. Pengukuran biomasa hutan ini akan dikonversi menjadi cadangan karbon dengan menggunakan *Pedoman International Panel on Climate Change Good Practice Guidelines (IPCC-GPG)*. Survey karbon ini menghasilkan cadangan karbon sebenarnya pada masing-masing tipe hutan. Sampai periode penyusunan proposal survey karbon telah

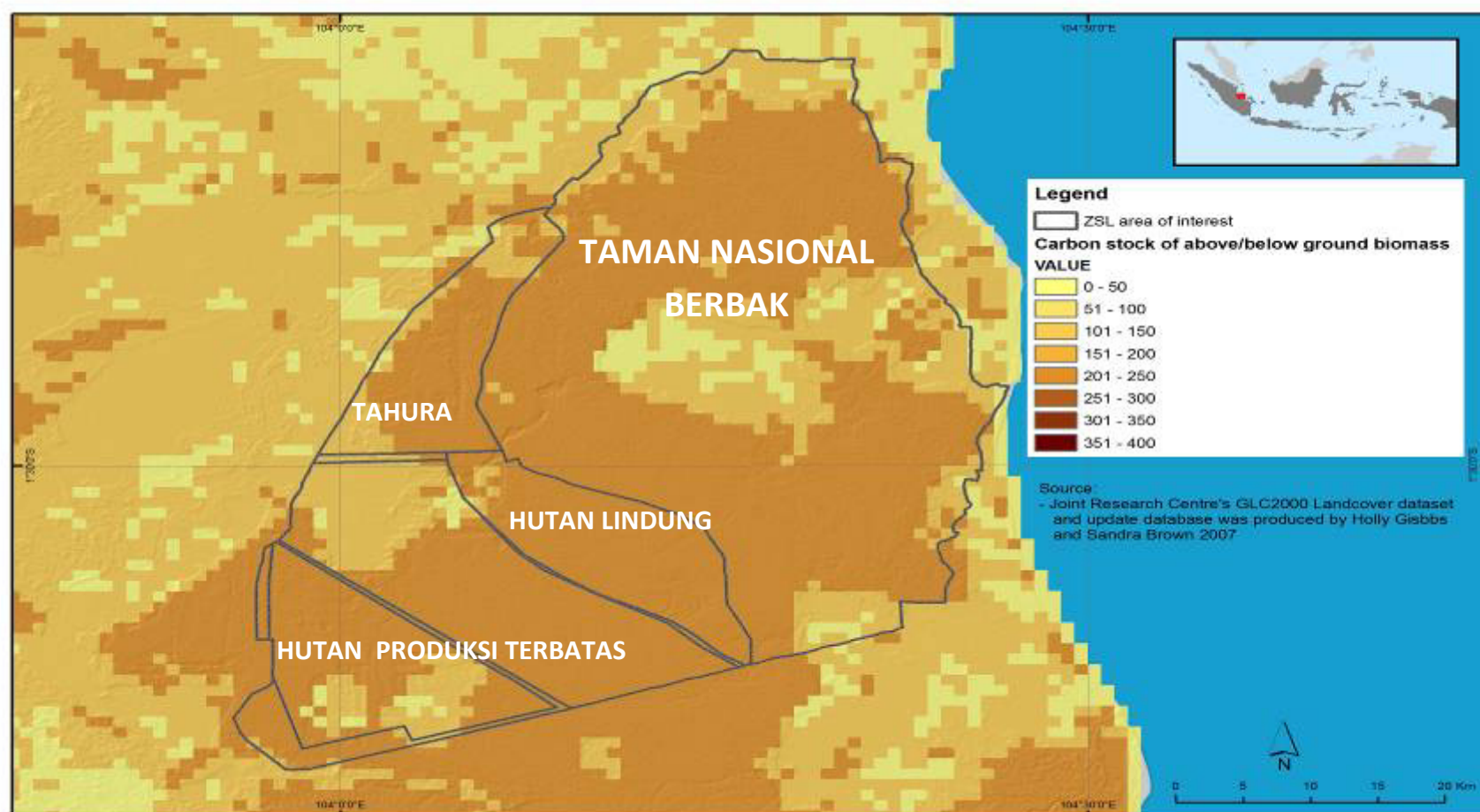
dilaksanakan 30 (tiga puluh) petak yang berlokasi diberbagai tipe hutan yang berbeda di Taman Nasional Berbak.

Informasi tentang kedalaman gambut dan jumlah kandungan karbon aktual di Taman Nasional Berbak telah berhasil dihitung. Kandungan karbon tersebut hanya didasarkan pada estimasi biomasa dan karbon hutan di atas permukaan tanah (above ground biomass). Lihat pada Tabel 5. Dari hasil analisis pada Tabel 5 diperlihatkan bahwa total nilai rata-rata jumlah kandungan karbon adalah 75,89 C ton per-hektar. Lahan gambut menyimpan karbon pada biomasa tanaman, serasah di bawah hutan gambut, lapisan gambut dan lapisan tanah mineral di bawah gambut (substratum). Dari berbagai simpanan tersebut, lapisan gambut dan biomassa tanaman menyimpan karbon dalam jumlah tertinggi. Lahan gambut menyimpan karbon yang jauh lebih tinggi dibandingkan dengan tanah mineral. Di daerah tropis karbon yang disimpan tanah dan tanaman pada lahan gambut bisa lebih dari 10 kali karbon yang disimpan oleh tanah dan tanaman pada tanah mineral. Hal itu dikarenakan gudang karbon (carbon pool) di tipe hutan rawa gambut terletak di dalam tanah, berbeda dengan tipe hutan dataran bertanah mineral yang karbon tersimpannya berada di biomasa pohon. Di hutan Rawa Gambut Singkil, berdasarkan letak simpanan karbon, bagian di bawah permukaan tanah) mengandung 95,45% dari simpanan karbon kawasan tersebut dan hanya 4,54% yang terdapat dalam tegakan hutan (karbon di atas permukaan).

TABEL 2. Sejarah dan Laju Deforestasi di Bentang Alam Hutan Gambut Berbak

Tahun	Lokasi	Luas Tutupan Hutan (hektar)	Kehilangan Luas Hutan (hektar)	% Laju Deforestasi (-ha/kawasan berhutan)	Rata-rata Kehilangan Hutan Tahunan (hektar)	Rata-rata Deforestasi Tahunan (hektar/kawasan berhutan/tahun)	Rata-rata Deforestasi Per-Unit Pengelolaan Selama 19 Tahun
1990	Taman Nasional	136,273.65	-	-	-	-	-1.14%
2000	Taman Nasional	106,750.91	29,522.74	-21.66%	29,522.74	-2.17%	
2005	Taman Nasional	106,712.08	38.82	-0.04%	38.82	-0.01%	
2009	Taman Nasional	106,712.08	0.00	0.00%	0.00	0.00%	
1990	Hutan Lindung	18,693.25	-	-	-	-	-0.75%
2000	Hutan Lindung	18,195.11	498.14	-2.66%	498.14	-0.27%	
2005	Hutan Lindung	17,647.45	547.65	-3.01%	547.65	-0.60%	
2009	Hutan Lindung	16,149.09	1,498.35	-8.49%	1,498.35	-2.12%	
1990	Taman Hutan Raya	17,032.31	-	-	-	-	-3.03%
2000	Taman Hutan Raya	12,403.61	4,628.70	-27.18%	4,628.70	-2.72%	
2005	Taman Hutan Raya	9,728.09	2,675.51	-21.57%	2,675.51	-4.31%	
2009	Taman Hutan Raya	8,863.20	864.88	-8.89%	864.88	-2.22%	
1990	Hutan Produksi Total	61,937.38	-	-	-	-	-2.43%
2000	Hutan Produksi Total	48,075.96	13,861.41	-22.38%	-1,386.14	-2.24%	
2005	Hutan Produksi Total	43,151.00	-4,924.96	-10.24%	-984.99	-2.05%	
2009	Hutan Produksi Total	37,344.38	-5,806.62	-13.46%	-1,451.66	-3.36%	

Sumber : Zoological Society of London dan Forest Carbon (2011)



PETA 2. Kandungan karbon diatas dan dibawah permukaan tanah di Bentang Alam Hutan Gambut Berbak, termasuk kawasan Taman Nasional Berbak . Nilai setiap pixel adalah kepadatan karbon (ton karbon per-hektar) (Dianalisis kembali berdasarkan Gibbs, H., Brown, S., and Olson et al. 2007)

Tabel 4. Hasil Analisis Cadangan dan Emisi Karbon Berdasarkan Pendekatan Tier 1 Tingkat Kerincian 1) Pada Masing-masing Unit Pengelolaan Hutan di Bentang Alam Hutan Gambut Berbak

Lokasi	Luas (hektar)	Kisaran (ton C/ha)	Cadangan Karbon (~ton C)	Emisi CO ₂ (ton CO ₂ e)
Taman Nasional Berbak	140,198	0 - 225	~25,988,500	~ 95,988,500
Hutan Lindung	18,705	4 - 225	~4,129,680	~ 15,155,925
Taman Hutan Raya	17,599	5 - 225	~3,377,990	~ 12,397,223
Hutan Produksi Terbatas - IUPHHK-HA PT. Putraduta Indah Wood	33,562	4 - 225	~6,419,260	~ 23,558,684
Hutan Produksi Terbatas - IUPHHK- HTI PT. Pesona Rimba Persada	20,951	4 - 225	~3,951,400	~ 14,501,638
Total	238,716		~45,473,790	~ 44,031,265

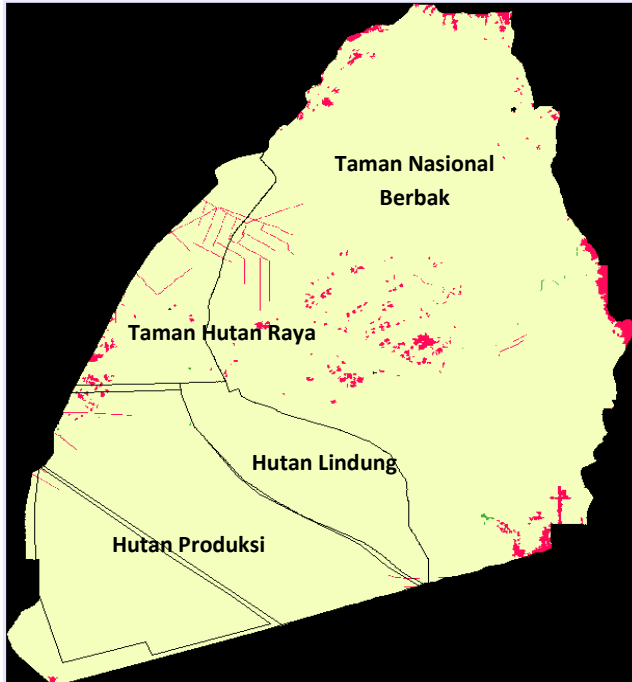
Sumber : Zoological Society of London dan Forest Carbon (2011)

TABEL 5. Kandungan Karbon diatas Permukaan Tanah dan Kedalaman Gambut di Taman Nasional Berbak

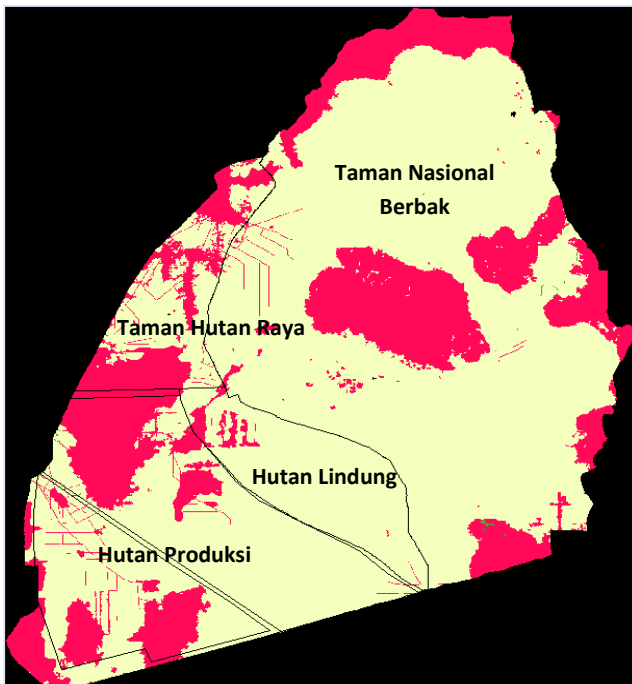
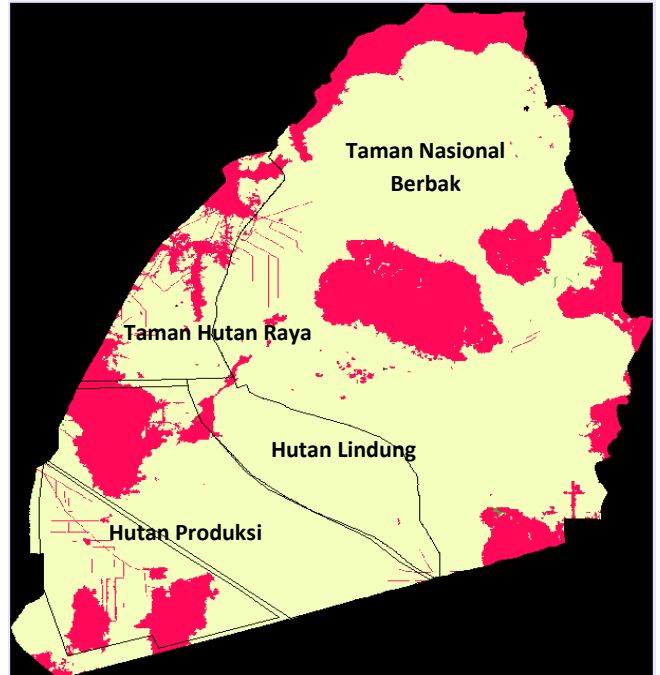
TIPE LAHAN/ JUMLAH PLOT	LUAS (Hektar)	BIOMASA/KARBON				KEDALAMAN GAMBUT		
		Total (ton/hektar)	Rata-rata (ton/ha)	Rata-rata kandungan Karbon (C ton/ha)	Total Kandungan Karbon Per-Tipe Lahan (C ton)	Minimum (cm)	Maksimum (cm)	Rata-rata (cm)
Hutan Primer (14)	72.269	2.753,4	211,8	105,9	7.653.287	1.05	5.20	5.20
Hutan Sekunder (10)	27.717	1.434,8	143,5	71,7	1.987.308	0.95	5.27	5.27
Semak Belukar (6)	30.337	300,2	100,1	50	1.516.850	0.00	0.00	0.00
TOTAL			151,8	75,89	11.157.445			

Sumber : Data Primer Zoological Society of London (2011)

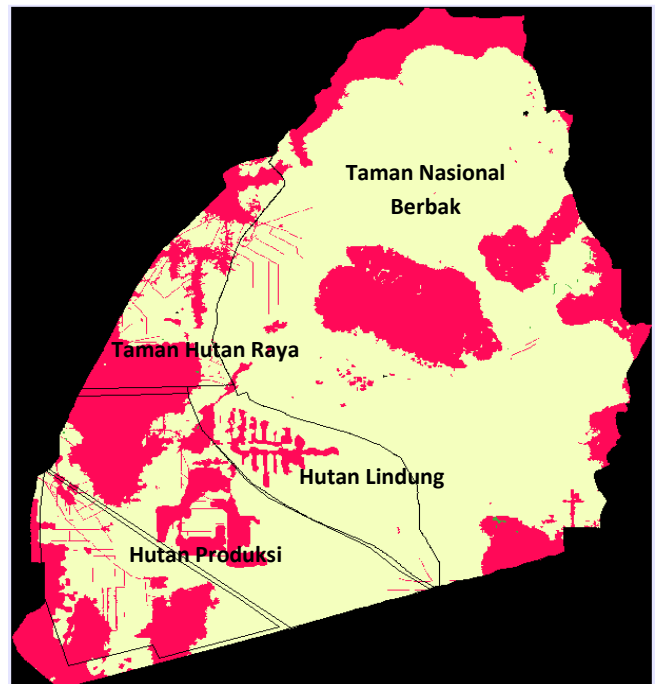
TAHUN 1990



TAHUN 2000



TAHUN 2005



TAHUN 2009

PETA 3. Sejarah perubahan tutupan hutan di Bentang Alam Hutan Gambut Berbak, akibat adanya deforestasi dan degradasi hutan, termasuk Kawasan TN. Berbak pada periode tahun 1990 – 2009. 'Warna Merah' menunjukkan kawasan tidak berhutan dan 'Warna Kuning' menunjukkan kawasan masih berhutan.

3. Proyeksi Emisi Karbon

Dalam upaya membangun marka dasar emisi karbon sebagai konsekuensi praktek-praktek pemanfaatan lahan secara *'business as usual'* dari Proyek REDD, maka harus dipertimbangkan faktor-faktor sejarah laju deforestasi dan skenario deforestasi masa depan serta faktor utama pendorong deforestasi pada saat proyek REDD+ dimulai. Perhitungan deforestasi masa depan adalah persyaratan dari semua proyek karbon hutan. Upaya pencegahan deforestasi tidak hanya mengandalkan penghitungan sejarah laju deforestasi sebagai basis penghitungan emisi karbon hutan yang akan dihasilkan pada masa depan, karena adanya sejumlah faktor yaitu :

- a) Sejarah deforestasi tidak selalu akurat mengindikasikan deforestasi masa depan, dan
- b) Lokasi aktual deforestasi masa depan harus diketahui untuk menghitung hilangnya cadangan karbon tertentu dari lokasi.

Hal itu menjadikan pendekatan analisis berbasis citra satelit GEOMOD (*Geo Modelling*) dengan menggunakan perangkat *Landuse Use Change Moduler Software* telah diterapkan untuk mengetahui marka dasar emisi karbon hutan, karena sudah diketahui dengan baik untuk menilai deforestasi masa depan. Pendekatan ini merupakan langkah penting dalam memenuhi syarat informasi yang diminta dalam Standar Voluntary Carbon Standard (VCS).

Dalam memahami lokasi deforestasi masa depan, termasuk di Kawasan Taman Nasional Berbak, maka dibutuhkan informasi lokasi deforestasi yang terjadi sekarang ini, sehingga diketahui variabel terkait dan penting sebagai pendorong deforestasi. Ada beberapa variabel yang diperiksa, yaitu jarak dari jalan transportasi, jarak dari kanal, jarak dari kerusakan dapada periode 1990 – 2000, jarak dari desa, jarak dari titik api (hotspot), zonasi lahan, perubahan lahan disebabkan penghidupan manusia. Dibawah ini disajikan beberapa peta hasil dari GEOMOD Modeling.

Dari analisis peta disimpulkan bahwa kondisi masa depan Taman Nasional Berbak memiliki nilai kerentanan atau ancaman yang tinggi terjadinya deforestasi dengan meningkatnya emisi karbon hutan. Ancaman tersebut diakibatkan adanya faktor-faktor yang menjadi pendorong utama (*deforestation driver*), seperti jarak dari jalan transportasi, jarak dari kanal, jarak dari kerusakan, jarak dari desa, dan jarak dari titik api (hotspot).

Dari hasil analisis GEOMOD juga dihasilkan model deforestasi pada masa depan. Diprediksi di kawasan Bentang Alam Berbak berdasarkan simulasi 30 tahun kedepan, laju rata-rata deforestasi tahunan diperkirakan -0,9%. Dari hasil analisis pada Tabel 5, sebagian besar tutupan hutan hutan produksi telah hilang pada tahun 2037. Sedangkan tutupan hutan di Kawasan Taman Nasional Berbak dan Taman Hutan Raya serta sebagian besar Hutan Lindung Gambut akan tetap utuh pada tahun 2037. Daerah terbuka yang luas di bagian tengah dan sebelah Barat TN.Berbak yang merupakan hasil dari lima peristiwa kebakaran yang berbeda selama 12 tahun terakhir. Kerusakan hutan akibat kebakaran adalah faktor perubah yang sangat penting, namun masih sulit diprediksi. karena masih belum adanya metode simulasi pemodelan yang tepat.

Dan apabila faktor bencana kebakaran hutan yang luas diabaikan, maka diprediksi kawasan Taman Nasional Berbak pada tahun 2037 hanya kehilangan hutan sebesar 1.800 hektar.

Luasan tutupan hutan ini lebih kecil dibandingkan dengan kawasan hutan sekitar TN. Berbak, yaitu Kawasan Lindung Gambut, Kawasan Hutan Taman Raya dan Hutan Produksi yang pada tahun 2037 akan kehilangan hutan secara berurutan sebesar 4.500 hektar, 4.700 hektar dan 24.263 hektar.

Kegiatan ilegal karena adanya faktor jalan dan kanal terlihat dari sisi barat TN. Berbak, tetapi tidak disimulasikan menjadi model, karena diasumsikan bahwa kawasan ini adalah kawasan lindung yang dikelola dan dipantau. Kegiatan illegal ini pernah terjadi pada tahun 1990-an, tetapi tidak berkembang sampai saat ini.

Akhirnya dapat disimpulkan, bahwa 40.863 hektar kawasan hutan akan hilang antara 2008 sampai tahun 2037 di Lansekap Hutan Gambut Berbak, termasuk TN. Berbak. Hal ini tentunya menimbulkan dampak terhadap perubahan kondisi iklim yang akan dibahas pada bagian dokumen proposal berikutnya.

Marka dasar emisi karbon dihitung berdasarkan metodologi yang dikembangkan oleh Winrock Internasional mengenai oksidasi gambut dari drainase. Emisi deforestasi didasarkan pada penggabungan hasil simulasi Perubahan Tata Guna Lahan dengan pendekatan Tier-1, sehingga dapat diperkirakan nilai karbon perhektar adalah 112 ton C per-hektar.

Sumber emisi karbon di TN. Berbak telah diketahui penyebabnya, karena adanya faktor ancaman-ancaman deforestasi tidak terencana (*unplanned deforestation*) seperti penebangan liar atau konversi hutan untuk pertanian dan perkebunan serta pengeringan hutan gambut dengan melalui pembuatan kanal dalam Daerah Aliran Sungai Air Hitam Laut. Total emisi bersih karbon hutan yang akan dihasilkan 30 tahun kedepan adalah 34.400.430 ton CO₂e. Jumlah nilai emisi yang bersumber dari pengeringan hutan gambut menempati porsi lebih besar dibandingkan dengan emisi yang berasal dari deforestasi tidak terencana. Adapun faktor deforestasi dan degradasi hutan terencana (*planned deforestation*) tidak ditemukan di TN. Berbak.

Pada Tabel 6 dan Diagram 1 di bawah ini menggambarkan hasil simulasi marka dasar emisi (CO₂e) di TN. Nasional Berbak dengan adanya deforestasi dan pengeringan hutan gambut selama 30 tahun ke depan tanpa adanya intervensi Proyek REDD atau Business as Usual (BAU)

TABEL 6. Marka Dasar (Baseline) Emisi Karbon di TN. Nasional Berbak Selama 30 Tahun Tanpa Intervensi Proyek REDD (*Business An Usual*)

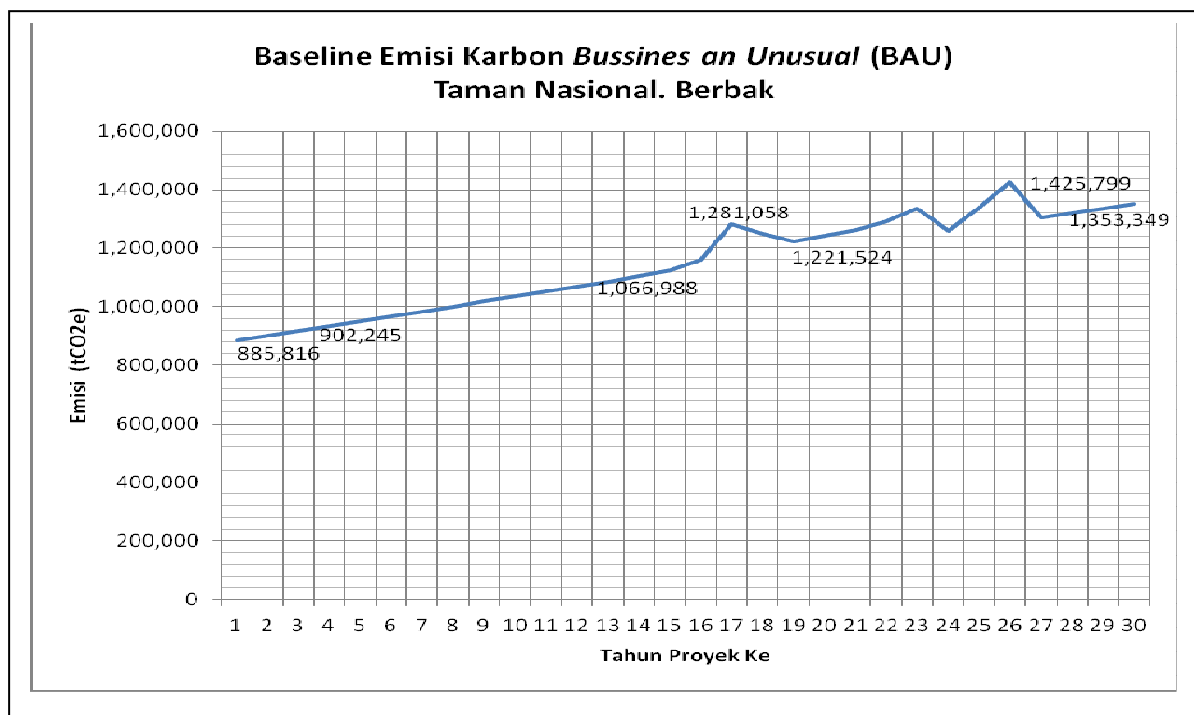
Tahun Ke	Tahun	Emisi Karbon Dari Degradasi Hutan Terencana (tCO ₂ e)	Emisi Karbon Dari Deforestasi Tidak Terencana (tCO ₂ e)	Emisi Dari Pengeringan Gambut (tCO ₂ e)	Emisi Bersih Karbon Hutan (tCO ₂ e)	Emisi Kumulatif Karbon Hutan (tCO ₂ e)
-1	2007		0	0	0	0
1	2008	0	0	885,816	885,816	885,816
2	2009	0	0	902,245	902,245	1,788,061
3	2010	0	0	918,673	918,673	2,706,734
4	2011	0	0	935,101	935,101	3,641,835
5	2012	0	0	951,529	951,529	4,593,364
6	2013	0	0	967,957	967,957	5,561,322
7	2014	0	0	984,386	984,386	6,545,707
8	2015	0	0	1,000,814	1,000,814	7,546,521
9	2016	0	0	1,017,242	1,017,242	8,563,763
10	2017	0	0	1,033,670	1,033,670	9,597,433
11	2018	0	0	1,050,098	1,050,098	10,647,531
12	2019	0	462	1,066,526	1,066,988	11,714,519
13	2020	0	1,083	1,082,955	1,084,037	12,798,557
14	2021	0	4,565	1,099,383	1,103,948	13,902,504
15	2022	0	8,270	1,115,811	1,124,081	15,026,585
16	2023	0	26,372	1,132,239	1,158,611	16,185,196
17	2024	0	132,391	1,148,667	1,281,058	17,466,254
18	2025	0	82,600	1,165,096	1,247,695	18,713,950
19	2026	0	40,000	1,181,524	1,221,524	19,935,474
20	2027	0	41,969	1,197,952	1,239,921	21,175,395
21	2028	0	47,207	1,214,380	1,261,587	22,436,982
22	2029	0	59,366	1,230,808	1,290,175	23,727,157
23	2030	0	89,246	1,247,237	1,336,483	25,063,640
24	2031	0	-6,520	1,263,665	1,257,145	26,320,784
25	2032	0	58,926	1,280,093	1,339,019	27,659,804
26	2033	0	129,278	1,296,521	1,425,799	29,085,602
27	2034	0	-8,885	1,312,949	1,304,065	30,389,667
28	2035	0	-8,885	1,329,377	1,320,493	31,710,160
29	2036	0	-8,885	1,345,806	1,336,921	33,047,081
30	2037	0	-8,885	1,362,234	1,353,349	34,400,430
31	2038	0	0	1,378,662	1,378,662	35,779,092
Total		0	679,676	33,720,754	34,400,430	

Sumber : Zoological Society of London dan Forest Carbon (2010)

Pada Tabel 6 ditunjukkan bahwa sumber emisi karbon yang bersumber dari ancaman pengeringan hutan gambut akibat pembangunan jaringan kanal memiliki efek signifikan pada nilai marka dasar emisi karbon secara keseluruhan di Taman Nasional Berbak. Nilai ini akan menjadi menjadi lebih besar, karena belum sepenuhnya sistim jaringan kanal dipetakan di lapangan. Kanal yang dipetakan sebagian besar didasarkan pada spekulasi dari interpretasi foto citra satelit resolusi tinggi (SPOT) .

Sistem kanal yang lebih luas yang diyakini ada di daerah barat daya menuju Kawasan Hutan Produksi Terbatas. Kawasan ini merupakan daerah hulu Sungai Air Hitam Laut yang merupakan sumber air utama dari Taman Nasional Berbak di daerah hilirnya. Survey kanal di lapangan sangat diperlukan untuk menguatkan atau memperbaiki penafsiran nilai emisi karbon hutan.

DIAGRAM 1. Grafik Base Line Emisi Karbon di TN. Nasional Berbak Selama 30 Tahun Tanpa Intervensi Proyek REDD (*Business An Unusual*)



4. Ancaman dan Faktor Dorongan Deforestasi

Pelaku, pendorong deforestasi (deforestation driver) dan analisis penyebab utama deforestasi diperlukan untuk menilai apakah tingkat masa depan deforestasi sebagaimana dijelaskan dalam di Taman Nasional Berbak cenderung mengalami perubahan dibandingkan masa sekarang, maka perlu untuk menganalisis kelompok utama agen deforestasi (petani, peternak, penebang, dll). Analisis ini juga diperlukan untuk menentukan pemilihan strategi pelaksanaan REDD + yang paling tepat dan mencegah efek kebocoran emisi dalam Proyek REDD+, sehingga dapat mengurangi secara signifikan tingkat emisi karbon sekaligus

mengurangi kemiskinan, konservasi keanekaragaman hayati dan perlindungan lingkungan jasa. Lihat Tabel 7 di bawah ini.

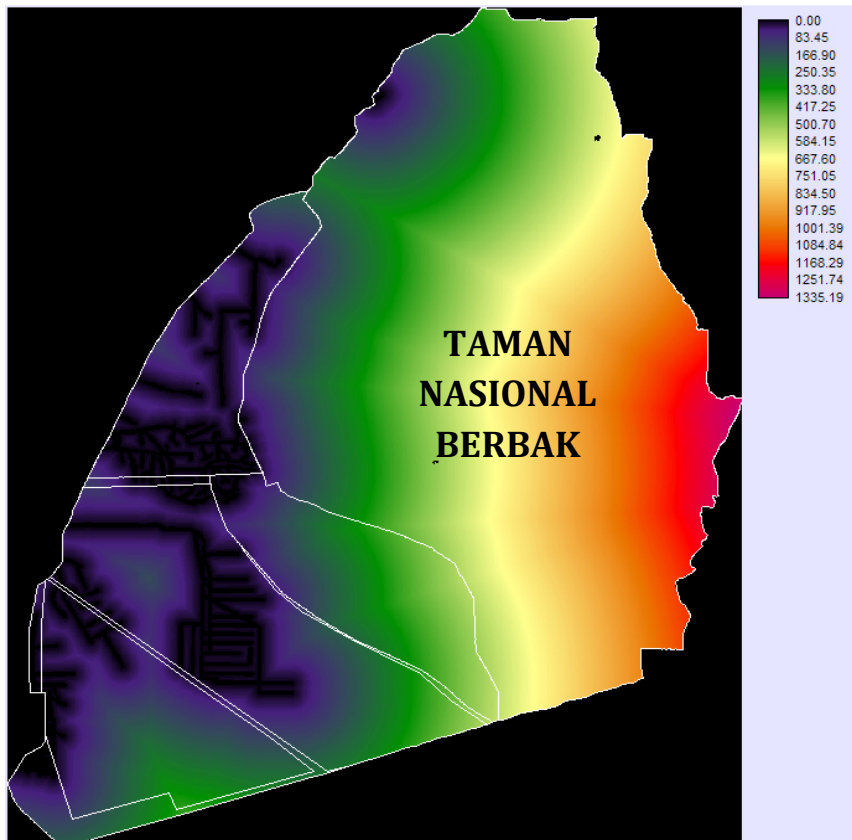
Pendorong deforestasi yang memotivasi mereka dalam mengambil keputusan penggunaan lahan disekitar Taman Nasional Berbak dan evolusi kemungkinan masa depan mereka telah dianalisis melalui studi kepustakaan, survey lapangan dan pertemuan dengan para pemangku kepentingan setempat . Ada tiga kelompok yang berbeda dari pelaku deforestasi yang dapat menimbulkan kebocoran emisi di Kawasan Taman Nasional Berbak, yaitu :

- a) Pelaku deforestasi lokal yang memperoleh mata pencaharian mereka di dalam atau dekat daerah Taman Nasional Berbak sejak awal kegiatan proyek REDD. Kelompok Ini akan menjadi kelompok utama dalam banyak kasus mosaik deforestasi dan pengeringan hutan gambut. Risiko menggosok kegiatan kelompok lokal harus diatasi dalam desain kegiatan Proyek REDD dengan menggunakan salah satu atau kedua dari dua pendekatan berikut: i). Pengecualian dari daerah Proyek REDD+ dari lokasi hutan yang kemungkinan akan digunduli oleh kelompok-kelompok selama pelaksanaan kegiatan Proyek REDD ii). Perubahan laju deforestasi di wilayah ini, dibandingkan dengan kasus awal, harus dihitung sebagai kebocoran (*leakage*) , iii). Pelaksanaan pencegahan kebocoran emisi dengan menggunakan langkah-langkah untuk mempertahankan atau meningkatkan mata pencaharian para kelompok-kelompok lokal tersebut, seperti penciptaan alternatif penghidupan yang lebih berkelanjutan, pemanfaatan bentang alam lahan berkelanjutan dan penciptaan lapangan kerja berbasis lahan atau non-lahan.
- b) Pelaku deforestasi dari imigran yang kemungkinan akan merambah hutan Taman Nasional Berbak dan menimbulkan kebocoran emisi karbon pada periode mendatang, seharusnya diantisipasi dan dipindahkan dari lokasi Proyek REDD dengan upaya penegakan hukum dan memindahkan mereka ke lokasi yang tepat dan secara sukarela di luar lokasi Proyek REDD Taman Nasional Berbak.
- c) Pelaku sektor swasta yang diperkirakan akan merambah kawasan hutan Taman Nasional Berbak di masa mendatang, seperti perusahaan-perusahaan kelapa sawit skala kecil. Risiko kebocoran emisi harus diatasi dalam rancangan kegiatan proyek REDD menggunakan salah satu atau kedua pendekatan berikut: i). Pengecualian dari lokasi Proyek REDD yang kemungkinan akan digunduli oleh kelompok-kelompok ini selama pelaksanaan kegiatan Proyek REDD ii). Mengatur tingkat deforestasi di wilayah ini, dibandingkan dengan kasus awal, sehingga harus dihitung sebagai kebocoran emisi (*leakage*), iii). Pelaksanaan pencegahan kebocoran dengan menggunakan langkah-langkah terkait mempertahankan mempertahankan hak konsesi mereka seperti pengelolaan perkebunan kelapa sawit berkelanjutan (sustainable palm oil) iv) Inklusi ke kawasan Proyek REDD di Daerah Penyangga Taman Nasional Berbak melalui perubahan fungsi untuk kepentingan konservasi atau konsesi restorasi ekosistem.

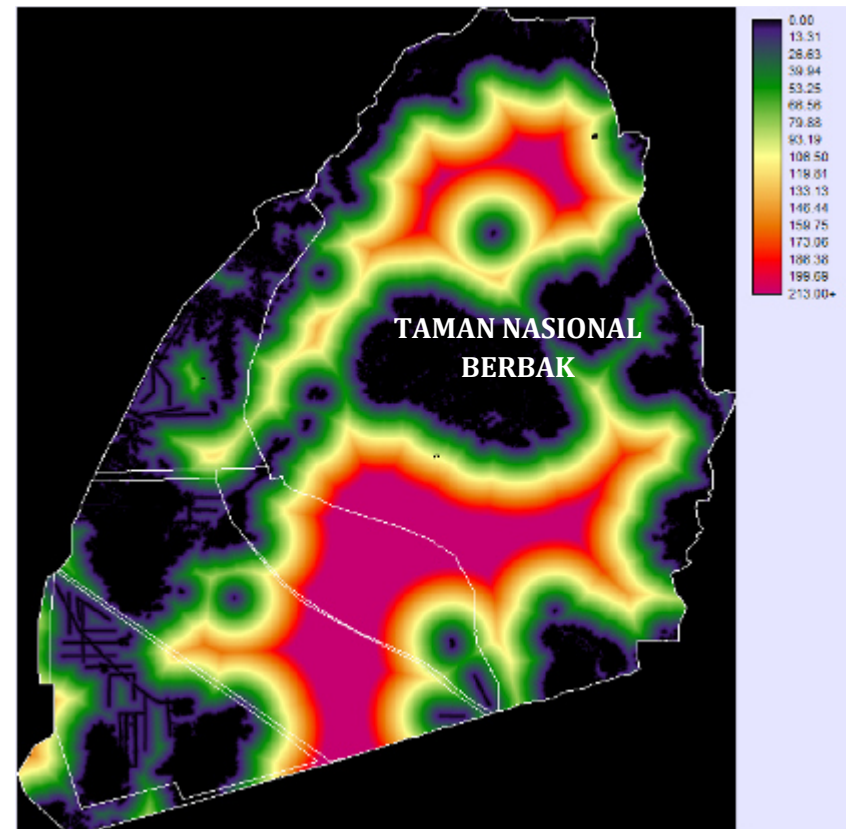
**Tabel 7. Tipologi Deforestasi dan Degradasi Hutan
Di Taman Nasional Berbak**

Tipe Deforestasi		Metodologi Deforestasi	Pelaku Kunci Deforestasi
Deforestasi	Tidak Terencana	Forest encroachment	Penduduk lokal dan penduduk imigran
		Kebakaran hutan skala besar	Penduduk lokal dan penduduk migran
		Mengakui kawasan hutan secara ilegal (land claming)	Penduduk lokal dan penduduk migran
		Pembangunan kanal di kawasan hutan rawa di daerah penyangga atau di dalam Taman Nasional	Penduduk lokal dan penduduk migran
Degradasi Hutan	Terencana	Perkebunan kelapa sawit skala kecil di Daerah Penyangga Taman Nasional	Kementerian Kehutanan, Pemerintah Daerah, sektor swasta
	Tidak Terencana	Penebangan liar	Penduduk lokal dan penduduk migran , sektor swasta
		Kebakaran hutan skala kecil akibat faktor alam	Alam
		Kebakaran hutan skala kecil akibat pembukaan lahan pertanian	Penduduk lokal dan penduduk migran , sektor swasta

JARAK DARI LOKASI KANAL

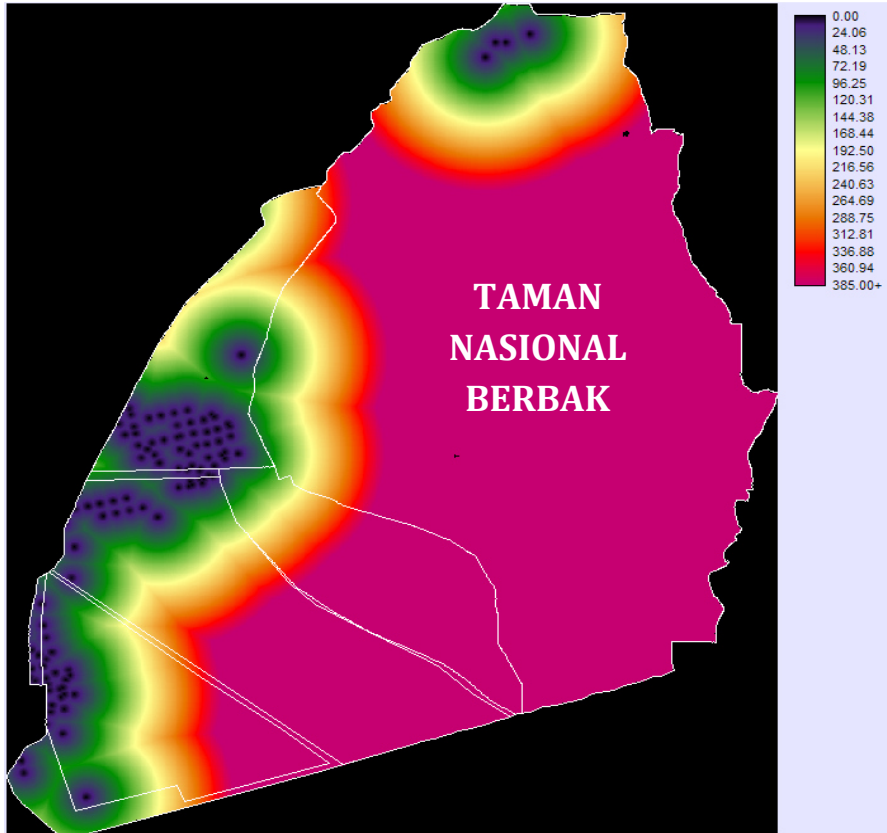


JARAK DARI LOKASI KERUSAKAN TAHUN 1990 - 2000

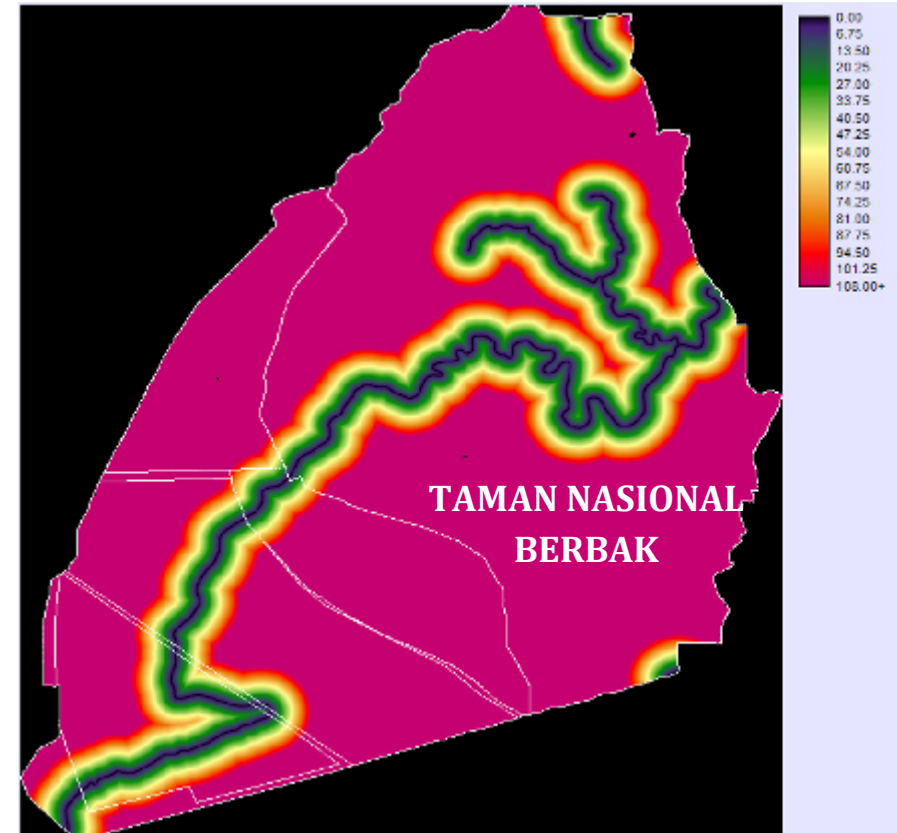


PETA 4. Peta pendorong utama deforestasi (deforestation driver) yang akan merubah tata guna lahan pada masa depan yang bersumber pada variabel jarak lokasi kanal dan jarak lokasi kerusakan 1990 – 2000 . Pada lagenda nilai kerentanan meningkat dari nilai tertinggi ke nilai terendah, ditandai perubahan warna dari warna biru gelap ke warna merah muda. Skala lagenda menunjukkan unit dalam meter.

JARAK DARI LOKASI TITIK API (HOTSPOT)

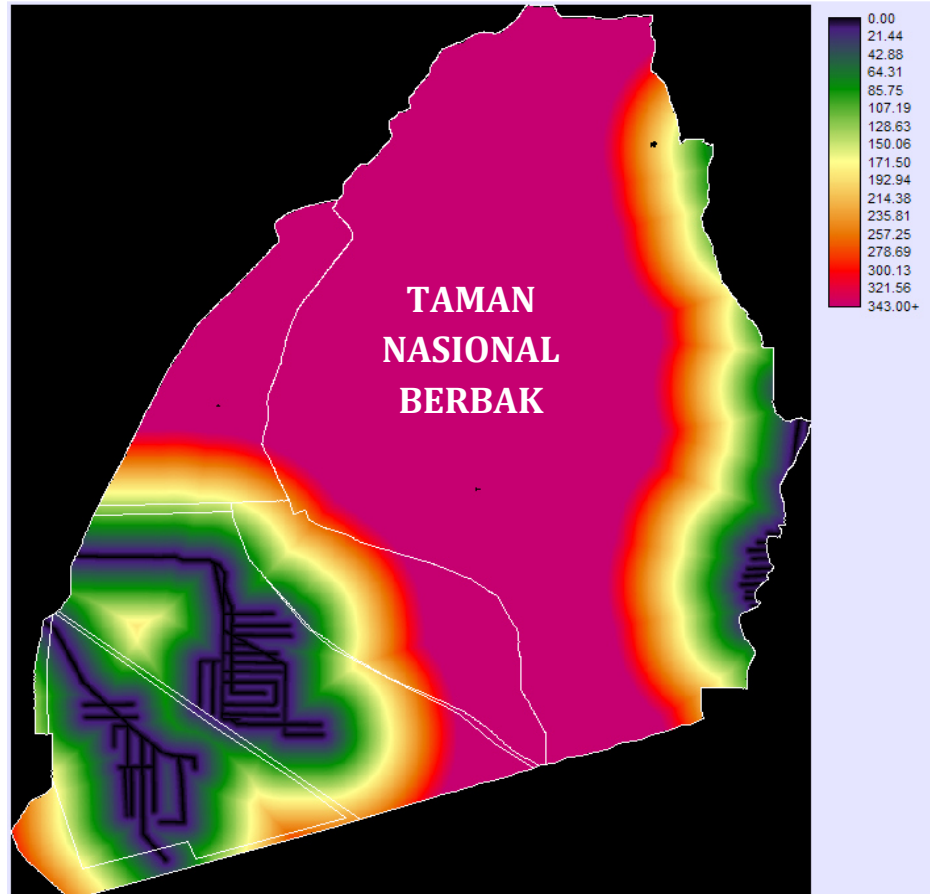


JARAK DARI SUNGAI

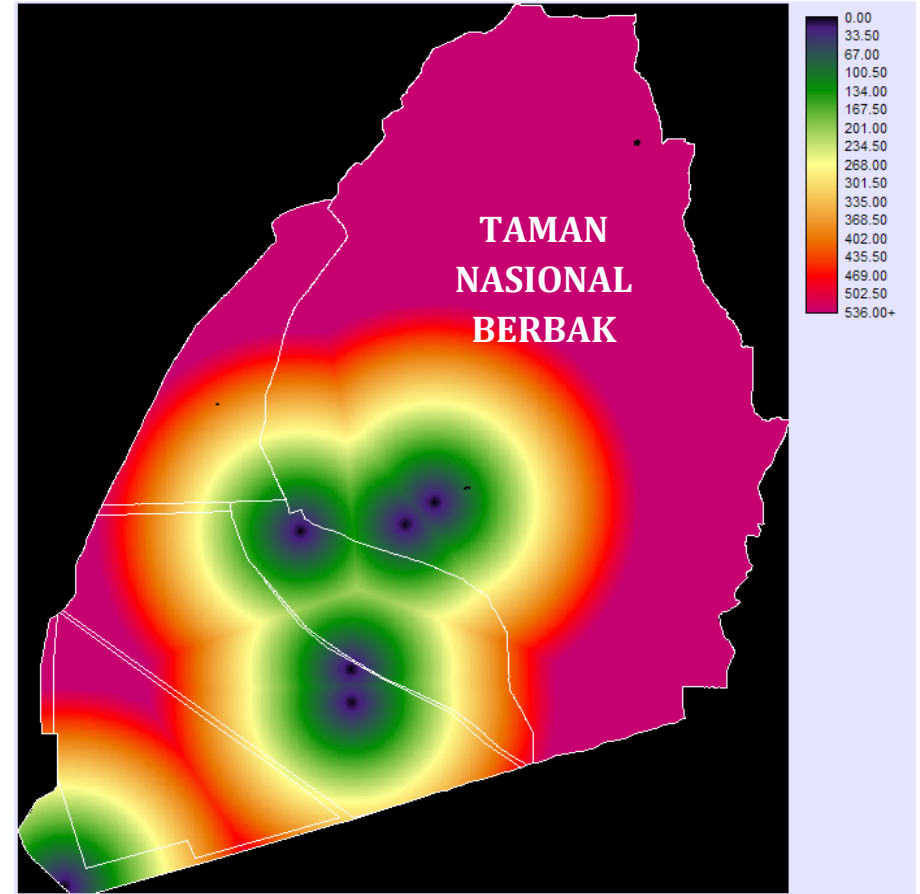


PETA 5. Peta pendorong utama deforestasi (*deforestation driver*) yang akan merubah tata guna lahan pada masa depan yang bersumber dari variabel jarak dari lokasi titik api dan jarak sungai . Pada legenda nilai kerentanan meningkat dari nilai tertinggi ke nilai terendah, ditandai perubahan warna dari warna biru gelap ke warna merah muda. Skala legenda menunjukkan unit dalam meter.

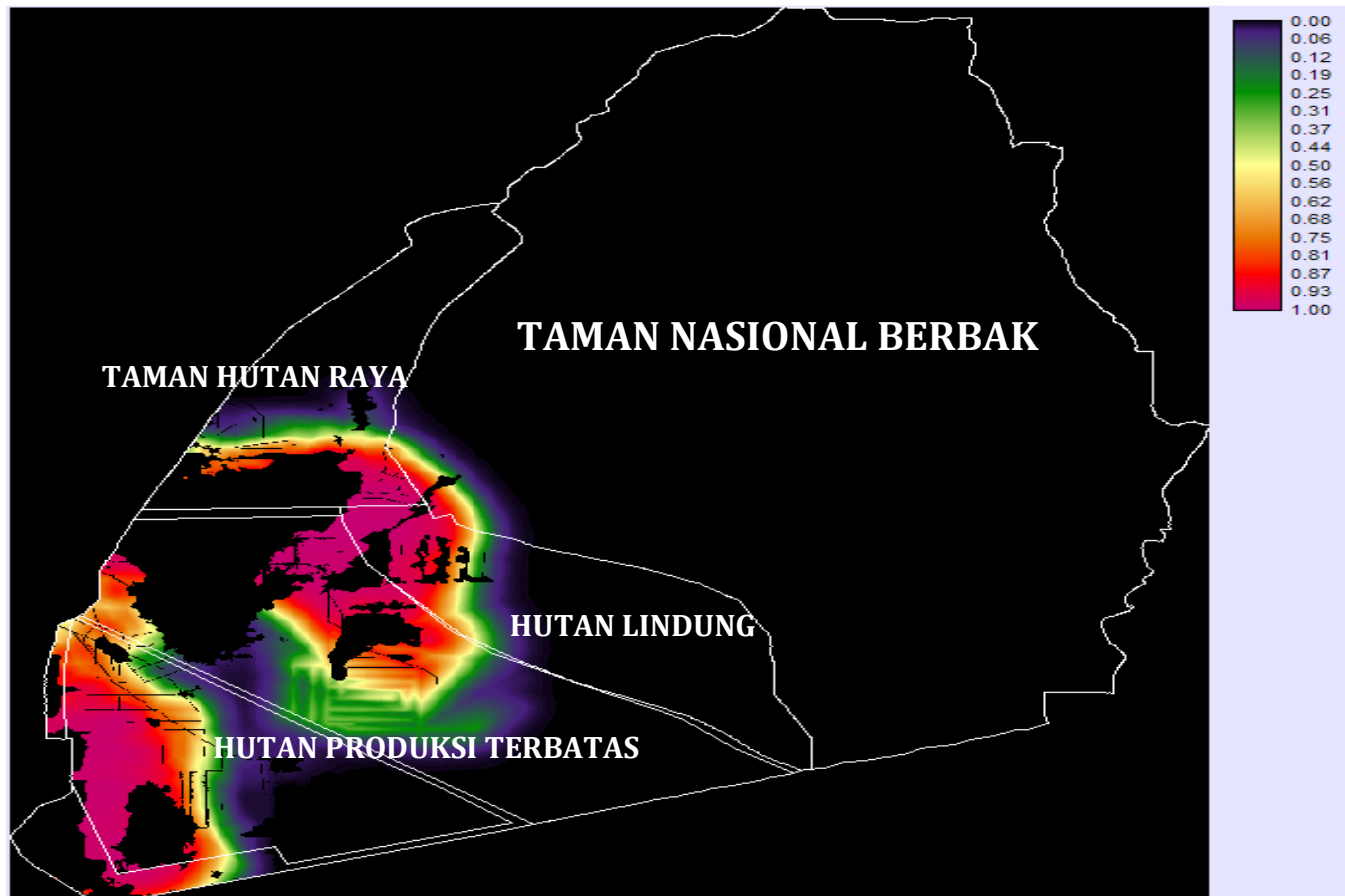
JARAK DARI LOKASI JALAN TRANSPORTASI



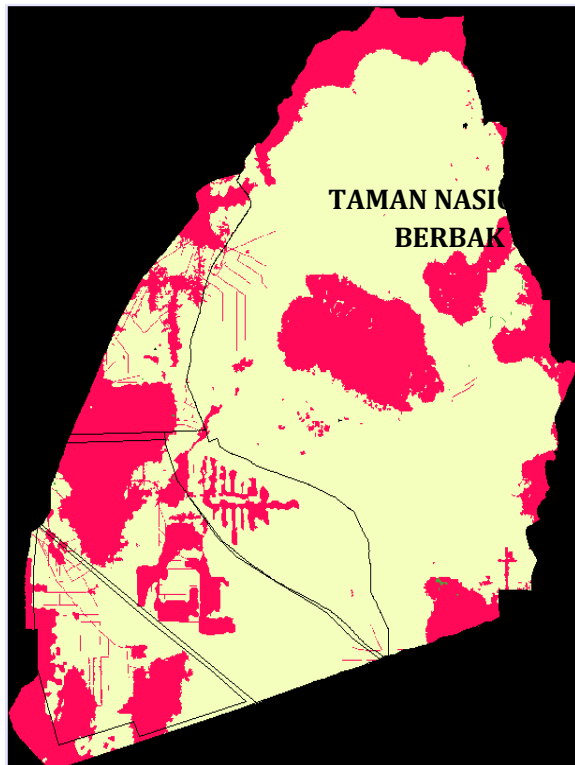
JARAK DARI LOKASI DESA



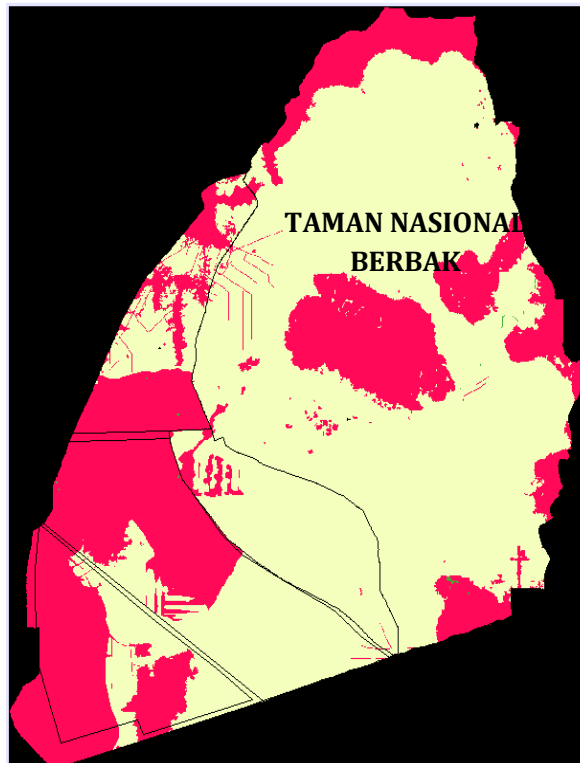
PETA 6. Peta pendorong utama deforestasi (deforestation driver) yang akan merubah tata guna lahan pada masa depan yang bersumber dari variabel jarak dari lokasi desa dan jarak jalan transportasi. Pada legenda nilai kerentanan meningkat dari nilai tertinggi ke nilai terendah, ditandai perubahan warna dari warna biru gelap ke warna merah muda. Skala legenda menunjukkan unit meter.



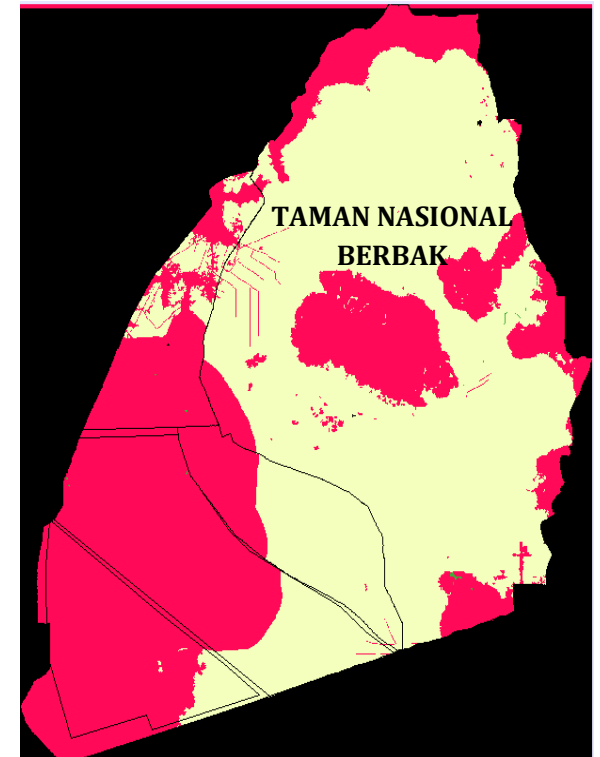
PETA 7. Peta potensial transisi perubahan tutupan pada masa depan akibat deforestasi berdasarkan seluruh faktor-faktor pendorong utama deforestasi (*deforestation driver*). Potensial yang lebih tinggi diartikan sebagai resiko yang lebih besar terjadinya transisi perubahan tata guna lahan dari berhutan ke non hutan . Warna Hitam diartikan daerah tanpa resiko terjadinya transisi. Skala legenda menunjukkan unit probabilitas.



KONDISI AKTUAL TAHUN 2009



PREDIKSI PERUBAHAN TAHUN 2018



PREDIKSI PERUBAHAN TAHUN 2037

PETA 8. Peta hasil simulasi model perubahan tutupan lahan dan hilangnya tutupan hutan berdasarkan analisis Geo Modelling berbasis citra satelit di Taman Nasional Berbak sampai tahun 2037. Warna merah dan warna kuning secara berurutan menunjukkan kawasan non hutan dan kawasan masih berhutan

5. Skenario Tipe Proyek REDD+

Skenario pelaksanaan Proyek REDD+ di Taman Nasional Berbak bertujuan untuk mengurangi emisi karbon hutan melalui perlindungan aktif dan pemantauan. Pada skenario ini difokuskan pada kegiatan dukungan untuk meningkatkan pengelolaan Taman Nasional, baik pada aspek-aspek kelembagaan, perlindungan kawasan dan konservasi spesies, pengembangan Daerah Penyangga Taman Nasional/Desa Konservasi serta membangun kapasitas pengelola.

Skenario tipe-tipe proyek REDD+ yang sementara yang dapat direkomendasikan untuk dipertimbangkan untuk dilaksanakan di TN. Berbak *menurut Nomenkatur Voluntary Carbon Standard – Guidance for AFOLU (Agriculture, Forest and other Land Use) Projects* (2008) dan , yaitu

1. Pembasahan Kembali dan Konservasi Gambut (*Peat Rewetting and Conservation*)

Tipe proyek REDD ini bertujuan untuk menghindari oksidasi gambut melalui pembasahan kembali dan konservasi gambut. Kegiatan pembasahan kembali menyiratkan elevasi muka air rata-rata tahunan di lahan gambut ditingkatkan yang akan menghasilkan pengurangan emisi bersih gas rumah kaca.

Tipe proyek ini sangat diutamakan untuk dilaksanakan dengan pertimbangan, bahwa emisi karbon hutan akibat pengeringan hutan gambut berkontribusi paling besar atau setara dengan nilai 33.720.754 ton CO₂e atau 98 % terhadap jumlah total emisi karbon hutan yang dihasilkan Taman Nasional Berbak dalam kurun waktu 30 tahun.

2. Pencegahan Mosaik Deforestasi dan Degradasi Tidak Terencana (*Avoiding Unplanned Mosaic Deforestation and Degradation*)

Tipe proyek ini bertujuan untuk menghindari deforestasi dan degradasi hutan yang tidak terencana dengan menghentikan deforestasi dan hutan yang terdegradasi kembali pulih menjadi hutan dewasa dalam pola mosaik. Deforestasi dan degradasi hutan biasanya terjadi akibat tekanan penduduk, bencana kebakaran hutan dan praktek penggunaan lahan yang menghasilkan kondisi noktah-noktah lahan yang terbuka, hutan terdegradasi, hutan sekunder dengan berbagai usia pertumbuhan dan hutan dewasa. Dalam situasi hutan mempunyai aksesibilitas tinggi untuk dijangkau manusia, maka para pelaku deforestasi akan hadir ke dalam wilayah yang mengandung kawasan yang akan dilindungi.

Tipe Proyek REDD+ ini masih sangat terbatas untuk dilaksanakan dengan pertimbangan, bahwa emisi karbon hutan akibat deforestasi tidak terencana ini berkontribusi sangat kecil atau setara dengan 679,676 ton CO₂e atau 2 % terhadap jumlah total emisi karbon hutan yang dihasilkan Taman Nasional Berbak dalam jangka waktu 30 tahun.

Penebangan liar adalah salah satu sumber emisi akibat deforestasi tidak terencana (*unplanned deforestation*). Selanjutnya, apabila ada fakta lapangan membuktikan bahwa penebangan liar kemungkinan akan terjadi ataupun masih berlangsung secara masif, sistematis dan terorganisir di dalam TN. Berbak, maka kasus tersebut dapat diagendakan

sebagai kegiatan utama dalam mitigasi emisi karbon hutan. Selanjutnya, apabila dalam studi lanjutan disimpulkan bahwa penebangan liar adalah penyumbang emisi utama, maka kegiatan preventif dan proteksi Kawasan Taman Nasional dapat dimasukkan dalam Rancangan Desain Proyek (*Project Design Document*) REDD+. Hal ini dapat dijadikan titik awal untuk menghubungkan penebangan liar dengan potensi kebakaran hutan.

6. Kontribusi Penurunan Emisi Dari Proyek REDD+

Berdasarkan skenario tipe-tipe Proyek REDD yang diusulkan untuk diimplementasikan di Taman Berbak sebagaimana telah diuraikan diatas, maka telah dihitung potensi produksi emisi karbon hutan selama 30 tahun kedepan dengan adanya Proyek REDD-. Jumlah total penurunan emisi dari 2 (dua) skenario tipe Proyek REDD+ adalah 17.988.207 ton CO₂e. Tipe Proyek "Pembasahan Kembali dan Konservasi Gambut" menempati posisi terbesar dalam mengurangi emisi karbon hutan di TN. Berbak selama 30 tahun ke depan dengan nilai 17.648.369 ton CO₂e. Sebaliknya, pada tipe Proyek "Pencegahan Mosaik Deforestasi dan Degradasi Tidak Terencana" hanya berkontribusi kecil yaitu 339,838 ton CO₂e selama 30 tahun. Pada Tabel 8 dan Tabel 9 dan Diagram 2 dan 3 dijelaskan mengenai kontribusi penurunan emisi karbon hutan pada masing-masing skenario tipe proyek REDD+ dalam kondisi tanpa Proyek REDD dan dengan Proyek REDD

TABEL 8. Emisi Karbon Selama 30 Tahun Tanpa dan Dengan Proyek REDD "Pembasahan Kembali dan Konservasi Gambut" di Taman Nasional Berbak

Tahun Proyek Ke-	Tahun	Emisi Karbon Dari Pengerangan Gambut (tCO ₂ e) – Tanpa Proyek REDD	Tingkat Keberhasilan Proyek Pembasahan Kembali dan Konservasi Gambut	Emisi Karbon Pelaksanaan Proyek Pembasahan Kembali dan Konservasi Gambut (tCO ₂ e) – Dengan Proyek REDD
-1	2007	0		
1	2008	885,816	0.00	0.00
2	2009	902,245	0.00	0.00
3	2010	918,673	0.00	0.00
4	2011	935,101	0.00	0.00
5	2012	951,529	0.00	0.00
6	2013	967,957	0.15	145,193.61
7	2014	984,386	0.20	196,877.11
8	2015	1,000,814	0.30	300,244.13
9	2016	1,017,242	0.35	356,034.68

Tahun Proyek Ke-	Tahun	Emisi Karbon Dari Pengeringan Gambut (tCO ₂ e) – Tanpa Proyek REDD	Tingkat Keberhasilan Proyek Pembasahan Kembali dan Konservasi Gambut	Emisi Karbon Pelaksanaan Proyek Pembasahan Kembali dan Konservasi Gambut (tCO ₂ e) – Dengan Proyek REDD
10	2017	1,033,670	0.45	465,151.56
11	2018	1,050,098	0.50	525,049.16
12	2019	1,066,526	0.55	586,589.57
13	2020	1,082,955	0.60	649,772.81
14	2021	1,099,383	0.62	681,617.38
15	2022	1,115,811	0.64	714,119.07
16	2023	1,132,239	0.66	747,277.89
17	2024	1,148,667	0.68	781,093.84
18	2025	1,165,096	0.70	815,566.92
19	2026	1,181,524	0.70	827,066.65
20	2027	1,197,952	0.70	838,566.38
21	2028	1,214,380	0.70	850,066.11
22	2029	1,230,808	0.70	861,565.84
23	2030	1,247,237	0.70	873,065.57
24	2031	1,263,665	0.70	884,565.29
25	2032	1,280,093	0.70	896,065.02
26	2033	1,296,521	0.70	907,564.75
27	2034	1,312,949	0.70	919,064.48
28	2035	1,329,377	0.70	930,564.21
29	2036	1,345,806	0.70	942,063.94
30	2037	1,362,234	0.70	953,563.67
31	2038	1,378,662		0
TOTAL		33,720,754		17,648,370

Sumber : Zoological Society of London Dan Forest Carbon (2011)

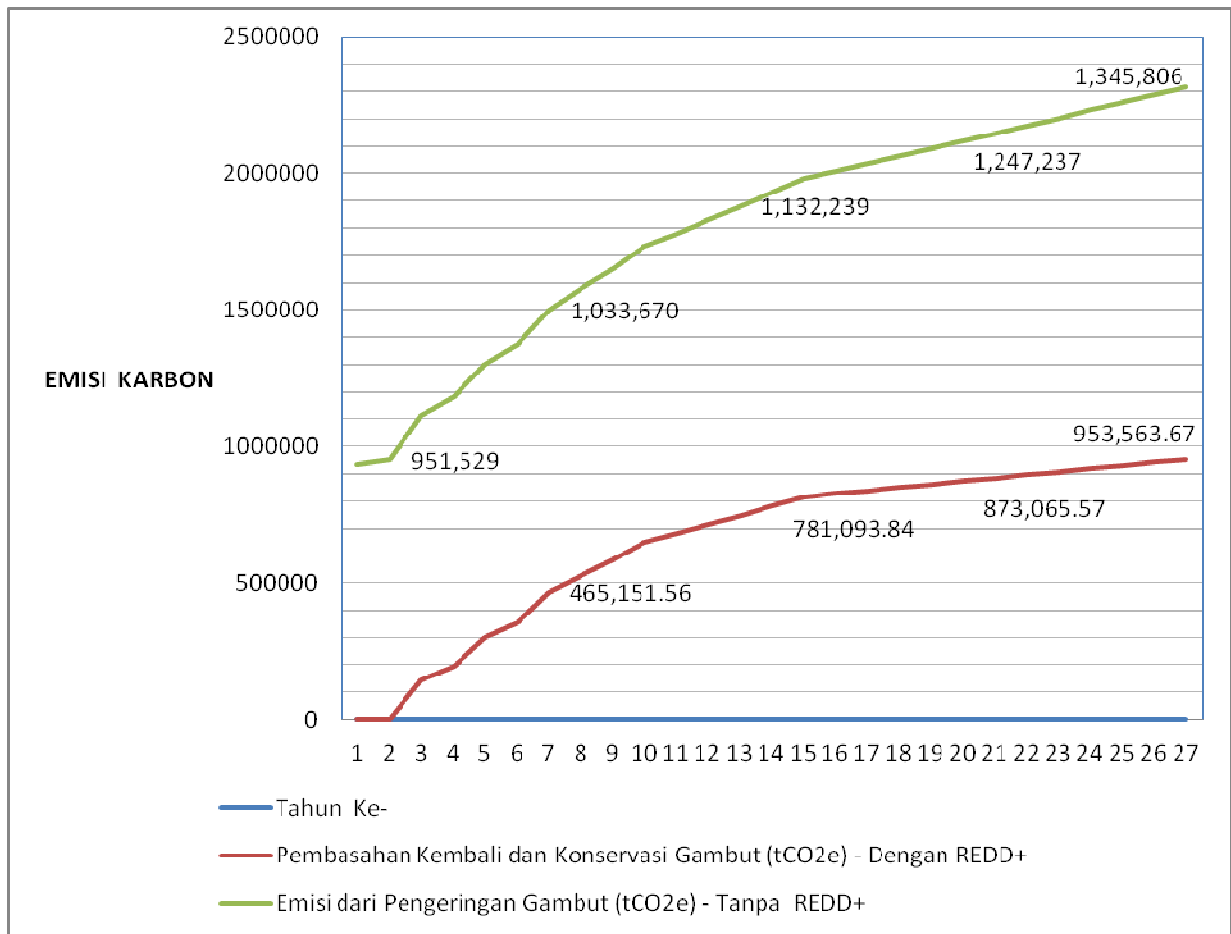


DIAGRAM 2. Grafik Emisi Karbon Selama 30 Tahun Tanpa dan Dengan Proyek REDD “Pembasahan Kembali dan Konservasi Gambut” di Taman Nasional Berbak

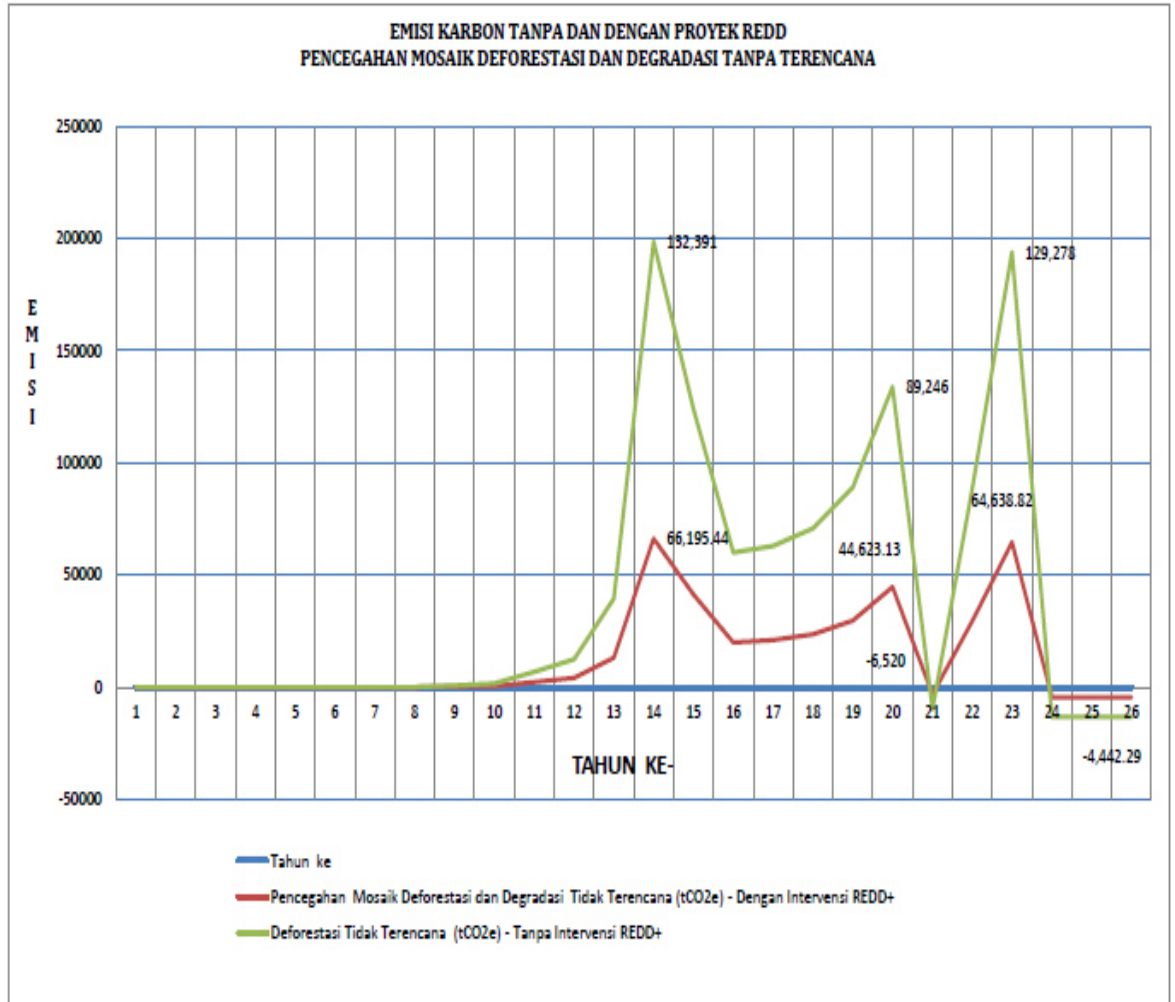
TABEL 9. Emisi Karbon Selama 30 Tahun Tanpa dan Dengan Proyek REDD "Pencegahan Mosaik Deforestasi Degradasi Tidak Terencana di Taman Nasional Berbak

Tahun Proyek Ke-	Tahun	Emisi Karbon Dari Deforestasi Tidak Terencana (tCO₂e) – Tanpa Proyek REDD	Tingkat Pencegahan Mosaik Deforestasi dan Degradasi Tidak Terencana	Emisi Karbon Pelaksanaan Proyek Pencegahan Mosaik Deforestasi dan Degradasi Tidak Terencana (tCO₂e) – Dengan Proyek REDD
-1	2007	0		
1	2008	0	0.00	0.00
2	2009	0	0.00	0.00
3	2010	0	0.00	0.00
4	2011	0	0.00	0.00
5	2012	0	0.00	0.00
6	2013	0	0.15	0.00
7	2014	0	0.20	0.00
8	2015	0	0.30	0.00
9	2016	0	0.35	0.00
10	2017	0	0.45	0.00
11	2018	0	0.50	0.00
12	2019	462	0.50	230.79
13	2020	1,083	0.50	541.31
14	2021	4,565	0.50	2,282.38
15	2022	8,270	0.50	4,134.87
16	2023	26,372	0.50	13,185.90
17	2024	132,391	0.50	66,195.44
18	2025	82,600	0.50	41,299.89
19	2026	40,000	0.50	20,000.18
20	2027	41,969	0.50	20,984.75
21	2028	47,207	0.50	23,603.37
22	2029	59,366	0.50	29,683.09

Tahun Proyek Ke-	Tahun	Emisi Karbon Dari Deforestasi Tidak Terencana (tCO ₂ e) – Tanpa Proyek REDD	Tingkat Pencegahan Mosaik Deforestasi dan Degradasi Tidak Terencana	Emisi Karbon Pelaksanaan Proyek Pencegahan Mosaik Deforestasi dan Degradasi Tidak Terencana (tCO ₂ e) – Dengan Proyek REDD
23	2030	89,246	0.50	44,623.13
24	2031	-6,520	0.50	-3,259.98
25	2032	58,926	0.50	29,463.21
26	2033	129,278	0.50	64,638.82
27	2034	-8,885	0.50	-4,442.29
28	2035	-8,885	0.50	-4,442.29
29	2036	-8,885	0.50	-4,442.29
30	2037	-8,885	0.50	-4,442.29
31	2038	0		0
TOTAL		679,676		339,838

Sumber : Zoological Society of London Dan Forest Carbon (2011)

DIAGRAM 3 Grafik Emisi Karbon Selama 30 Tahun Tanpa dan Dengan Proyek REDD “Pencegahan Mosaik Deforestasi dan Degradasi Tidak Terencana” di Taman Nasional Berbak



7. Potensi Pasar Karbon

Sumber biaya pelaksanaan REDD+ dapat langsung berasal dari non-pasar berupa skema bantuan pendanaan internasional atau program pemerintah nasional dan berasal dari pasar karbon. Dan pada saat ini sebagian dana sudah tersedia bagi proyek percontohan REDD melalui pasar karbon secara sukarela, namun sebagian besar uang yang akan disalurkan melalui "Pasar Mengikat" atau dana baru sebagai hasil negosiasi UNFCCC belum akan tersedia dalam beberapa tahun mendatang. Begitupun dengan biaya pelaksanaan REDD+ di Taman Nasional Berbak, nantinya akan ini berasal dari pendapatan yang dihasilkan dari penjualan emisi karbon melalui Pasar Karbon Sukarela.

Pada fase awal kesiapan REDD (readiness) di TN. Berbak pembiayaannya bersumber dari Zoological Society of London. Persiapan ini meliputi Pengkajian Berbasis Desktop dan Lapangan mengenai Potensi Pengurangan Emisi Karbon di Kawasan Berbak.. Selain itu pengumpulan data dasar tentang karbon, fenologi hutan, biodiversitas (harimau, burung dan gibbon), sosial dan persepsi masyarakat. Pendanaan kegiatan DA REDD+ di TN. Berbak pada fase persiapan DA REDD+ selama 3 tahun (2009-2012) seluruhnya didukung oleh Zoological Society of London melalui Proyek "*Berbak to the Future: Harnessing Carbon to Conserve Biodiversity*" yang pendanaannya bersumber dari Darwin Initiative - Department for Environment, Food and Rural Affairs (Defra) Pemerintah Inggris. Total pendanaan yang diinvestasikan dalam proyek tersebut sebesar GBP 298,000 atau setara dengan Rp. 4.352.000.000. Dana pendukung lainnya juga telah disediakan oleh Zoological Society of London untuk kegiatan-kegiatan monitoring harimau Sumatera dan penanganan konflik harimau dengan manusia. Dana ini bersumber dari hibah 21st Tiger Century Fund, Segre Fund dan Panthera Fund.

Dana persiapan lanjutan untuk penyusunan Dokumen Rancangan Proyek (*Project Design Document, PDD*) akan disediakan oleh Zoological Society of London. Dokumen PDD yang pertama akan diajukan dan divalidasi oleh pihak ketiga seperti *Voluntary Carbon Standard* dan *Climate Biodiversity Community Standard*. Dokumen ini disiapkan dalam hubungan untuk mendapatkan pembeli atau investor dalam kerangka perdagangan karbon hutan.

Potensi ekonomi dari penjualan emisi karbon hutan di Taman Nasional Berbak diperkirakan mencapai USD 167.278.020 atau setara dengan Rp. 1,5 Trilyun selama 30 tahun, apabila nanti diperdagangkan melalui "Pasar Sukarela" (*voluntary market*). Nilai pasar selama 30 tahun dari Tipe Proyek REDD "Pembasahan Kembali dan Konservasi Gambut" dengan nilai USD 163.881.956 lebih besar dibandingkan dengan tipe Proyek Pencegahan Mosaik Deforestasi dan Degradasi Tidak Terencana yang hanya bernilai USD 3.396.064.

Nilai ini diasumsikan bahwa, harga karbon di Pasar Sukarela mengalami kenaikan selama 30 tahun kedepan yang nilainya USD 5 sampai USD 10. Harga ini akan lebih tinggi, ketika Sistem "Pasar Mengikat" (*compliance market*) telah dibentuk oleh Perserikatan Bangsa Bangsa pada Paska Kyoto Protokol. Pada Tabel 10 dijelaskan nilai pasar potensial kredit bruto emisi karbon selama 30 tahun berdasarkan skenario Tipe Proyek REDD yang dilaksanakan di Taman Nasional Berbak. Analisis ini berdasarkan data yang tersedia tentang cadangan karbon, model deforestasi masa depan dan kedalaman drainase gambut. Semua

angka adalah indikatif dan tidak dimaksudkan untuk peramalan keuangan dari pendapatan proyek.

TABEL 10. Potensi Pasar Dari Produksi Kredit Emisi Karbon Selama 30 Tahun di Taman Nasional Berbak

Tahun Proyek Ke-	Tahun	Pencegahan Mosaik Deforestasi dan Degradasi Tidak Terencana"	Harga Pasar Emisi (Voluntary Market)	Nilai Pasar (USD)	Pembasahan Kembali dan Konservasi Gambut	Harga Pasar Emisi (Voluntary Market)	Nilai Pasar (USD)
-1	2007						
1	2008	0.00	\$5	\$0	0.00	\$5	\$0
2	2009	0.00	\$5	\$0	0.00	\$5	\$0
3	2010	0.00	\$5	\$0	0.00	\$5	\$0
4	2011	0.00	\$5	\$0	0.00	\$5	\$0
5	2012	0.00	\$5	\$0	0.00	\$5	\$0
6	2013	0.00	\$5	\$0	145,193.61	\$5	\$725,968
7	2014	0.00	\$5	\$0	196,877.11	\$5	\$984,386
8	2015	0.00	\$5	\$0	300,244.13	\$5	\$1,501,221
9	2016	0.00	\$5	\$0	356,034.68	\$5	\$1,780,173
10	2017	0.00	\$5	\$0	465,151.56	\$5	\$2,325,758
11	2018	0.00	\$7	\$0	525,049.16	\$7	\$3,675,344
12	2019	230.79	\$7	\$1,616	586,589.57	\$7	\$4,106,127
13	2020	541.31	\$7	\$3,789	649,772.81	\$7	\$4,548,410
14	2021	2,282.38	\$10	\$22,824	681,617.38	\$10	\$6,816,174
15	2022	4,134.87	\$10	\$41,349	714,119.07	\$10	\$7,141,191
16	2023	13,185.90	\$10	\$131,859	747,277.89	\$10	\$7,472,779
17	2024	66,195.44	\$10	\$661,954	781,093.84	\$10	\$7,810,938
18	2025	41,299.89	\$10	\$412,999	815,566.92	\$10	\$8,155,669
19	2026	20,000.18	\$10	\$200,002	827,066.65	\$10	\$8,270,666
20	2027	20,984.75	\$10	\$209,847	838,566.38	\$10	\$8,385,664

Tahun Proyek Ke-	Tahun	Pencegahan Mosaik Deforestasi dan Degradasi Tidak Terencana"	Harga Pasar Emisi (Voluntary Market)	Nilai Pasar (USD)	Pembasahan Kembali dan Konservasi Gambut	Harga Pasar Emisi (Voluntary Market)	Nilai Pasar (USD)
21	2028	23,603.37	\$10	\$236,034	850,066.11	\$10	\$8,500,661
22	2029	29,683.09	\$10	\$296,831	861,565.84	\$10	\$8,615,658
23	2030	44,623.13	\$10	\$446,231	873,065.57	\$10	\$8,730,656
24	2031	-3,259.98	\$10	-\$32,600	884,565.29	\$10	\$8,845,653
25	2032	29,463.21	\$10	\$294,632	896,065.02	\$10	\$8,960,650
26	2033	64,638.82	\$10	\$646,388	907,564.75	\$10	\$9,075,648
27	2034	-4,442.29	\$10	-\$44,423	919,064.48	\$10	\$9,190,645
28	2035	-4,442.29	\$10	-\$44,423	930,564.21	\$10	\$9,305,642
29	2036	-4,442.29	\$10	-\$44,423	942,063.94	\$10	\$9,420,639
30	2037	-4,442.29	\$10	-\$44,423	953,563.67	\$10	\$9,535,637
31	2038	0		\$0	0		\$0
Totals		339,838		3,396,064	17,648,370		163,881,956

Sumber : Zoological Society of London dan Forest Carbon (2010)

KOMPONEN KEGIATAN : MARKA DASAR KO-BENEFIT BIODIVERSITAS DAN MASYARAKAT

OUTPUT 3 : *Kuantifikasi nilai marka dasar (base line) manfaat dampingan (keanekaragaman hayati , masyarakat) dan hubungan dengan nilai marka dasar karbon*

Kegiatan pembangunan infra-struktur penelitian telah dilakukan oleh Proyek PRO BERBAK untuk mendukung kajian lapang terkait pengumpulan data dasar keanekaragaman hayati. PRO BERBAK telah memberikan asistensi finansial berasal dari hibah KPMG kepada Balai Taman Nasional Berbak dengan mengembangkan Kantor Simpang Malaka menjadi Stasiun Penelitian dan Pondok Kerja Peneliti. Disamping itu memperkuat kapasitas personil pengelola PRO BERBAK seperti rekrutmen Manajer Proyek, Deputy Manager, Koordinator Survey dan para anggota Tim Survey. Laporan pelaksanaan diuraikan lebih lanjut dalam Laporan bertajuk *Berbak for to the Future* pada Lampiran 1.

Survey keanekaragaman hayati burung telah dilaksanakan sepanjang periode tahun Ke-1. Hasil survey telah dapat mengidentifikasi 201 jenis burung dari 36 keluarga burung.

Sebagian besar atau 161 jenis burung hidup di hutan primer gambut. Jumlah ini merupakan 57% dari total 355 jenis burung yang diketahui di Taman Nasional Berbak.

Kajian ini juga mencatat 8 jenis masuk kategori jenis pembentuk IBA (Important Bird Species) Peringkat A1 yang didefinisikan spesies terancam punah secara global, seperti Black Partridge *Melanoperdix niger*, White-winged Duck *Cairina scutulata*, Milky Stork *Mycteria cinerea*, Storm's Stork *Ciconia stormi*, Lesser Adjutant *Leptoptilos javanicus*, Spotted Greenshank *Tringa guttifer*, Silvery Wood-pigeon *Columba argentina*, Blue-banded Kingfisher *Alcedo euryzona*.

Dan diantara jenis burung yang ditemukan 79 jenis merupakan jenis burung yang dilindungi oleh Peraturan Pemerintah No. 7 Tahun 1999. Dan berdasarkan IUCN (*International Union for Conservation of Nature*) *Red List of Threatened Species*, 4 jenis diklasifikasikan *Endangered* (EN), 1 jenis digolongkan *Critically Endangered* (CR), 8 jenis diklasifikasikan *Vulnerable* (V), 55 jenis digolongkan *Less Concern* (LC) dan 5 jenis diklasifikasikan *Near Threatened* (NT).

Kajian ini menyimpulkan bahwa dalam perancangan dan pemantauan REDD+ faktor keanekaragaman hayati burung menjadi pertimbangan penting dan dapat menjadi dampak dampingan dari kegiatan REDD+.

Disamping, hasil kajian lainnya menyimpulkan bahwa pantai timur Jambi, khususnya Air Hitam Laut dan Pantai Cemara yang berbatasan langsung dengan Taman Nasional Berbak merupakan kawasan penting bagi jenis-jenis burung migran. Tercatat sebanyak 4.144 individu jenis burung dari 15 spesies. Jenis *Black-tailed Godwit* adalah spesies yang paling melimpah (48,43% dari jumlah total), diikuti oleh *Bar-tailed Godwit* (19,3%), *Terek Sandpiper* (6,86%) dan *Lesser Sand Plover* (6,75%). Jumlah Black-tailed Godwit dalam survei mencapai lebih dari 1% dari estimasi populasi burung migran untuk Jalur Asia Timur-Australasia. Hal ini menegaskan bahwa pantai timur Provinsi Jambi menyediakan habitat penting bagi Black-tailed Godwit dan juga merupakan daerah non-breeding penting bagi jenis burung migran di Asia Timur-Australasia.

Lebih detail dijelaskan laporan pada Lampiran 2 dan Lampiran 3.

Survey primata gibbon (*Hylobates agilis*) yang dilakukan pada 4 lokasi pengamatan mencatat sementara, kepadatan populasi gibbon 1.1 sampai 2.3 kelompok per-km² atau rata-rata 1.7 kelompok per-km². Lihat laporan pada Lampiran 5.

Pada periode proyek tahun Ke-1 juga telah dilaksanakan pengumpulan data jenis mamalia besar melalui kamera penjebak (camera trap). Tercatat dalam survey ini berhasil didokumentasikan 14 (empat belas) individu harimau Sumatera yang terdiri dari 6 individu betina, 6 individu jantan dan 2 individu tidak diketahui jenis kelaminnya. Pada periode tahun 2011 tercatat 2 individu mati, tetapi pada periode ini juga ditemukan 1 (satu) individu jantan. Sehingga total pada periode 2011 terdapat 13 individu harimau Sumatera. Dalam periode pemasangan kamera penjebak pada tahun 2007 sampai 2011, telah diketahui kepadatan harimau Sumatra di Taman Nasional Berbak adalah 3 individu per 100 km².

Hasil survey melalui kamera penjebak juga mengindikasikan harimau Sumatera lebih menyukai habitat hutan sekunder, khususnya di kawasan riparian (pinggir sungai) yang

umumnya didominasi hutan sekunder. Satwa mangsa harimau Sumatera umumnya babi hutab (*Sus scrofa*), Rusa Sambar (*Cervus unicolor*) dan monyet ekor panjang.

Total 27 jenis mamalia berhasil didokumentasikan dengan kamera penjebak. Dan semua jenis masuk dalam kategori IUCN Red. 1 jenis, Sumatran tiger (*Panthera tigris sumatrae*), diklasifikasikan *Critically Endangered*; 4 jenis digolongkan *Endangered*, termasuk Malayan tapir (*Tapirus indicus*) dan flat-headed cat (*Prionailurus planiceps*); 8 jenis diklasifikasikan *Vulnerable* termasuk bearded pig (*Sus barbatus*), Sumbar deer (*Cervus unicolor*), Malayan sun bear (*Helarctos malayanus*), dan banded palm civet (*Hemigalus derbyanus*); dan 14 jenis diklasifikasikan *Less Concern*, such as greater mouse deer (*Tragulus napu*), lesser mouse deer (*Tragulus javanicus*) dan wild pig (*Sus scrofa*). Dari total jenis yang ditemukan diantaranya 14 jenis dilindungi oleh Peraturan Pemerintah Indonesia No. 7 Tahun 1999, *Panthera tigris sumatrae*, *Tapirus indicus*, *Tragulus napu*, *Tragulus javanicus*, *Cervus unicolor*, *Prionailurus bengalensis*, *Prionailurus planiceps* and *Neofelis diardi*.

Disamping itu, semua jenis mamalia yang ditemukan diklasifikasikan masuk daftar CITES 6 jenis Appendix 1, 8 jenis Appendix 2 dan 4 jenis Appendix 3. Laporan terperinci dijabarkan pada Lampiran 4.

BAB 3 :

TANTANGAN IMPLEMENTASI DAN RENCANA PRIORITAS

1. Tantangan Implementasi

Upaya dan berbagai pendekatan konservasi kawasan hutan untuk menanggulangi deforestasi dan degradasi selama beberapa dasawarsa silam dan hingga detik ini di Provinsi Jambi, kenyataannya kurang berhasil dan berakhir mengecewakan, karena akhirnya deforestasi secara linier semakin meningkat seiring waktu dan luasan cakupan spasial. Misalnya kegagalan Proyek ICDP (*Integrated Conservation Development Program*) di Taman Nasional Kerinci Seblat atau *Integrated Swamp Development Program* di Ekosistem Berbak – Sembilangan. Kebijakan dan kegiatan sebelumnya untuk melestarikan dan mengelola hutan yang lebih baik telah memberi hasil yang mengecewakan. Rancangan kebijakannya umumnya buruk, tidak memberi perhatian yang memadai untuk menghadapi kekuatan deforestasi dan degradasi hutan yang luas dan masif atau pelaksanaannya terhambat oleh lemahnya kapasitas pengetahuan, finansial, teknologi, kemampuan serta kurangnya keterlibatan masyarakat lokal atau praktek-praktek tata kelola pemerintahan yang kurang baik.

Karena latar belakang ini, REDD+ harus membangkitkan keyakinan baru, bahwa upaya pendekatan konservasi hutan kali ini melalui penurunan emisi karbon dari deforestasi dan degradasi hutan akan berhasil. Hal itu dikarenakan adanya perbedaan terbesar antara REDD+ dengan prakarsa konservasi sebelumnya, ialah bahwa REDD+ berlandaskan pada imbalan berbasis kinerja. Lembaga donor internasional, dana atau pasar akhirnya akan memberi imbalan atas upaya nasional, daerah dan lokal berdasarkan hasil kinerja yang diraih dalam menurunkan emisi karbonnya.

Mencapai tujuan REDD+ bukanlah menjalani “bisnis seperti biasa” dalam kerja sama kehutanan internasional: intervensi teknis sedikit demi sedikit. Sebaliknya, REDD+ mengharuskan pergeseran transformatif pada ekonomi politik kehutanan, menantang perusakan hutan untuk keuntungan kepentingan kelompok terbatas dengan mengorbankan kepentingan domain publik yang lebih luas dan komunitas hutan. REDD+ adalah menyangkut perubahan ekonomi hutan melalui insentif baru untuk melestarikan layanan ekosistem yang penting secara global dan juga mengenai mengubah politik hutan dengan mengakui hak-hak dan norma-norma baru dalam pengambilan keputusan pengaturan tata guna lahan. Karena itu, ciri-ciri REDD+ yang membedakannya dari berbagai upaya di masa lalu untuk mengubah tata kelola dan pengelolaan hutan adalah penting. Salah satunya adalah keterkaitan dengan kinerja: menggeser fokus dari asupan dan keluaran proyek menjadi keluaran dan hasil adalah penting untuk keefektifan REDD+ dan keabsahannya.

Berbagai hikmah pembelajaran yang didapat dari generasi awal inisiatif REDD+ di Indonesia termasuk di Provinsi Jambi mencakup pentingnya skala yurisdiksi di antara tingkat nasional dan tingkat lokal dalam hal pengambilan keputusan penggunaan lahan, kebutuhan koordinasi lintas skala untuk menangani isu-isu seperti penguasaan lahan, pembagian

keuntungan, pengukuran, pelaporan dan verifikasi serta ketahanan minat dan lembaga-lembaga yang terkait dengan kegiatan bisnis seperti biasa.

Tantangan besar lainnya adalah menentukan pilhan yang paling sulit dalam perencanaan untuk melaksanakan REDD+ tersebut ialah apakah menciptakan lembaga yang sepenuhnya baru untuk mengelolanya atau menggunakan yang ada? Menciptakan lembaga baru memakan waktu dan mungkin sulit secara politis, sedangkan jika menggunakan lembaga yang ada, risikonya adalah mengundang kerangka pikir dan praktik dalam "*bisnis seperti biasa*". Agar berhasil dalam melaksanakan REDD+, setiap lembaga yang relevan dengan implementasi REDD+ harus mengambil peran baru atau yang diperluas dengan cara yang tidak biasa (*Business An Usual*). Cara baru dalam membangun agenda kerja bersama, bekerjasama lintas sektor, kelompok pemangku kepentingan, dan tingkat pemerintah yang dibutuhkan untuk merancang program.

Tidak kalah pentingnya adalah tantangan yang dihadapi guna mempersiapkan dan implementasi REDD+, pertama kali adalah memberikan pemahaman kepada setiap pihak, bahwa melaksanakan pengurangan emisi sekaligus upaya meningkatkan kapasitas penyerapan dan penyimpanan karbon, bukanlah semata-mata dikarenakan insentif positif yang akan diterima dari pihak manapun, tetapi justru pada kepentingan menghindarkan kehancuran lingkungan dan memastikan masa depan generasi berikutnya untuk mampu bertahan hidup. REDD+ justru merupakan momentum yang paling tepat untuk melakukan perbaikan atas kesalahan pengelolaan hutan, lahan dan lahan gambut selama ini.

Tantangan lainnya adalah pendekatan REDD+ juga harus menggairahkan dan memadukan tindakan lintas instansi dan kelompok pemangku kepentingan. Barangkali segi paling inovatif REDD+ dibandingkan dengan pendekatan masa lalu ialah negara perlu melihat jauh ke depan dan mempertimbangkan seluruh kebijakan dan lembaga yang mempengaruhi cadangan karbon hutan. Pendekatan REDD+ yang terbatas pada sektor kehutanan saja tidak akan memadai. Apa pun mengenai penyebab deforestasi dan degradasi menyimpulkan, bahwa kebijakan dan tindakan REDD+ perlu melampaui sektor kehutanan. Artinya, perencanaan, penganggaran, dan pengaturan pembangunan lintas sektor harus dipadukan dengan cara yang belum pernah terjadi sebelumnya.

2. Rencana Prioritas Tahun 2

Pada tahun ke-2 pelaksanaan PRO BERBAK, maka tekanan kegiatan akan difokuskan pada kegiatan-kegiatan sebagai berikut:

1. Melanjutkan kegiatan pengumpulan data dasar biodiversitas, khususnya harimau Sumatera, burung dan tumbuhan.
2. Melakukan kegiatan pemantauan fenologi hutan dan serasah hutan.
3. Melanjutkan kegiatan pengumpulan data emisi karbon hutan, khususnya terkait dengan kebakaran lahan gambut akibat pengeringan hutan gambut.

4. Melakukan kegiatan pengumpulan data penurunan permukaan air lahan gambut (subsiden) akibat pembangunan kanal-kanal di lahan gambut
5. Melakukan kegiatan pengumpulan data sosial ekonomi, aspirasi dan menyiapkan masyarakat lokal dalam implementasi REDD+.
6. Melanjutkan penciptaan kondisi pemungkin persiapan dan pelaksanaan implementasi penuh REDD+ di Kawasan Penyangga Taman Nasional Berbak, khususnya di Kawasan Tahura Tanjung, Hutan Lindung Gambut Air Hitam Dalam dan Hutan Produksi.
7. Melanjutkan dan memastikan dukungan Kementerian Kehutanan dalam persetujuan penyelenggaraan DA REDD di Taman Nasional Berbak.
8. Mencari dan menggalang potensi sumber-sumber pendanaan baru terkait dengan kelanjutan kegiatan persiapan dan pelaksanaan implementasi penuh REDD+ di Taman Nasional Berbak dan di Kawasan Penyangganya.

KOMPONEN IMPLEMENTASI KEGIATAN PENGURANGAN EMISI

OUTPUT 5 : *Terlaksananya strategi dan rencana-rencana kegiatan penurunan emisi CO₂e*

Pada periode tahun pertama, PRO BERBAK telah dilakukan kegiatan perlindungan/pengamanan kawasan hutan untuk mengurangi deforestasi tidak terencana seperti penebangan liar dan perburuan satwa liar, khususnya konflik harimau Sumatera dengan Manusia. Proyek PRO BERBAK telah melakukan pemodelan dan penguatan kelembagaan penanganan konflik satwa liar reaksi cepat yang disebut Unit Penanggulangan Konflik dan Kejahatan Lingkungan (UPPKL) yang beroperasi di wilayah Ekosistem Berbak. Tim terpadu ini beranggotakan Pegawai Negeri Sipil (PNS) dari Balai Konservasi Sumber Daya Alam Jambi, Balai Taman Nasional, Dinas Kehutanan dan diperkuat oleh kelompok masyarakat.

Kegiatan yang dilakukan UPPKL telah menghasilkan deteksi konflik satwa harimau Sumatera dengan manusia dapat diketahui dan ditangani lebih cepat. Pada Lampiran 6 dilaporkan secara lebih detail mengenai hasil kegiatan dari UPPKL.

LAMPIRAN 1.

Berbak Carbon Initiative Progress Report

Conserving Carbon, Conserving Wildlife

BERBAK TO THE FUTURE



'Jamantara', a male Sumatran tiger, photographed in Berbak National Park

PROGRESS REPORT TO KPMG

Background

In December 2007 The Zoological Society of London worked with KPMG to introduce newly qualified senior managers to real world conservation issues as part of a training course. Amongst the issues presented was the concept of harnessing developing carbon markets designed to address climate change to drive tiger conservation. Following the training course a donation of £25,000 was made to aid development of the carbon-wildlife conservation concept for tigers in Indonesia. This summary outlines how this money was used and how it has formed the foundations for what is fast becoming one of the Society's key projects.

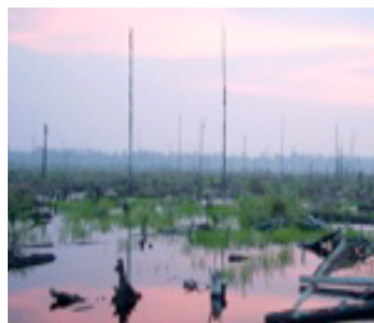
Conserving carbon, cats and crocodiles

As the importance of climate change has become apparent, markets for carbon credits have been developing, both on a voluntary basis as buyers look to offset emissions and on a higher value compliance basis through rules established under the Kyoto Protocol. One method for generating carbon credits is through avoided deforestation, whereby credits are earned by preventing emissions that would have occurred through deforestation. At present, carbon credits generated through avoided deforestation are only eligible for sale on voluntary markets, but discussions are currently underway within the UNFCCC¹ to establish avoided deforestation or REDD² as part of the compliance framework which has led to a lot of interest in the development of suitable projects. Since one of the key issues for tiger conservation is habitat loss, generation of carbon credits by reducing deforestation and degradation represents an indirect, but potentially powerful financial incentive for conserving tigers and other wildlife through habitat protection at the same time as addressing climate change. This potential was recently strengthened by the recent adoption of the principle of REDD+ in the UNFCCC Copenhagen Accord, with the '+' recognizing the requirement of REDD to have positive impacts on biodiversity and communities.

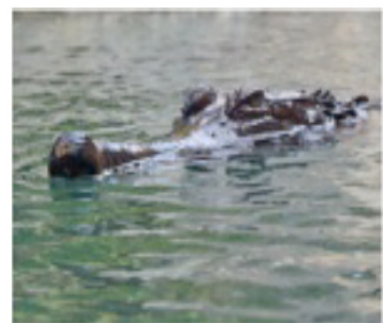
The Berbak ecosystem of eastern Sumatra represents an ideal site to demonstrate that combatting climate change can be married to wildlife conservation. Home to two critically endangered predators, the Sumatran tiger and the False Ghavial, the peat swamps of Berbak also represent one of Indonesia's largest sources of greenhouse gas emissions. At present forest protection is negligible and the future for the forests and their biodiversity looks bleak as logging, fire and peat drainage takes its toll. If an REDD framework can be implemented in Berbak it will create a strong financial incentive to address forest losses and remove one of the primary threats to species losses as well as forming the basis for a new model for conservation forest management nationally and internationally. This is the goal for the ZSL Berbak Carbon Initiative.



Sumatran tiger in Berbak



Deforestation in Berbak



False ghavial

Project vision and goal

The ultimate vision for the project is to see the forests of the Berbak ecosystem becoming a self-financing unit with measurable benefits for greenhouse emissions, forest biodiversity and local communities. However, achieving the emission reductions required to generate significant emission reductions will require investment beyond the scope of the project at the beginning. Furthermore, REDD is such a new concept that the requirements for establishing a working project for voluntary markets are still hazy, whilst even the existence of compliance markets is yet to be confirmed. The immediate goal of the BCI is therefore to put into place all of the *requirements* for an economically viable REDD project by 2012, with the expectation that activities to actually reduce emissions and generate revenue will begin shortly after.

Objectives

The core objectives cover the primary requirements for an REDD project:

1. Establish a viable and legal institutional framework for project implementation
2. Determine emission baselines in a 'business as usual' scenario
3. Assess strategies for reducing emissions
4. Identify how to maximise 'co-benefits' (to biodiversity and local communities)



Rhinoceros hornbill, Berbak

KPMG funding

With KPMG funds the first raised to begin the BCI they were spent on the most fundamental step required to complete all subsequent objectives: the establishment of logistics on the ground. With the Berbak ecosystem predominantly comprising inhospitable swamp forest, with the primary access point via the sea and a network of rivers being the primary way of moving within the project area, establishment of a permanent base and some sort of transport to reach it was essential. Firstly we commissioned the renovation of an abandoned guard post in the middle of the national park. Construction took nearly a year after permissions were organised but now we have sleeping quarters, a kitchen and dining house, bathrooms, a jetty and a store with a generator for electricity in the evenings. Simpang Malaka based is now occupied permanently by National Park and ZSL staff and has already hosted a number of visiting researchers and government officials to the site, including the British Ambassador to Indonesia.



Simpang Malaka when we arrived



Building the jetty



Building the mess house



Simpang Malaka base, March 2010

The second destination for the KPMG funding was to commission the building of four boats:

- A sea-worthy diesel barge ('pompong') for travel to the site
- A small boat or 'ketek' with an outboard motor for travel within the site (see previous photo)
- Two wooden canoes for paddling up creeks



The pompong being built



The completed pompong at Simpang Malaka



Unga, boat captain



Concurrent project activities

Using KPMG's financial assistance as matched funding, additional resources were then successfully applied for from numerous sources and the Berbak Carbon Initiative has now been fully operational since April 2009 with a full time project manager and deputy, a community officer, a field manager and a field team comprising six people. All of the staff are Indonesian, many are from Berbak communities.

In this first year, much progress has been made toward the project goal. Objective one has been the primary focus of Dr. Agus Suratno, the project manager. With Indonesian law on REDD yet to be clarified he has spent many days in the corridors of the Forestry Department to the point that now we can confidently say that all key government personnel involved in REDD are aware and supportive of the Berbak project, from the new Minister of Forestry through the members of the Council on Climate Change and down through the ranks. Our political status was given a further boost in March 2010 when British Ambassador to Indonesia, Martin Hatfull, visited the project in a show of support, together with senior members of the Jambi government. This visit was followed with a formal 'launch' of the project in Jakarta at the Ambassador's residence to which key government officials and potential investors were invited. Year two will continue to build on this base of political support and endeavor to get the project registered on paper as a formal demonstration activity as well as clarifying the legal status of the project proponent.

Objective two is now all but complete following collaboration with Jakarta-based consultants Forest Carbon to assess historical deforestation levels in the area using satellite imagery before modelling likely future forest loss, and associated greenhouse gas emissions. Their results show massive projected emissions over the next decades, with 164 million tonnes of CO₂e predicted to be lost over the next 30 years if we continue with 'business as usual' in Berbak. Their report includes some rough estimates of the costs fairly conservative emission reduction activities, demonstrating that the project does not just have high potential to be economically feasible but also has the potential to generate some significant profits. Year two will now focus on ground truthing many of the values used in these models.

Objective three will mainly be the focus of years two to three, but some work has begun with the establishment of an Environmental Crime and Conflict team comprising staff from all three government departments with a remit to protect the forests and natural resources. The team will partially function to assess the scale of protection measures needed to reduce emissions from deforestation, but were also set up as a response to a number of tiger attacks in the area, with eight people losing their lives in 2008 and a further one in 2009.

Objective four is also well underway, with camera trapping studies of tigers so far revealing high densities in the region of the base camp and surveys of false gharial now underway. Community studies are being undertaken in conjunction with two local NGOs specialising in community relations and, with their help, we have now compiled demographic data for the region and are now establishing community baselines and socialising the REDD plans.



Socialising project plans



Demonstrating camera trapping to the British Ambassador



Most of the team

LAMPIRAN 2

Technical Report

Bird Species Diversity and Reducing Emissions from Deforestation and Degradation in Berbak Peat Swamp Forest Jambi Province Indonesia

**Erwin A Perbatakusuma, Dolly Priatna, Dedi Rahman, Mulya Shakti,
Waluyo Sugito, Citra Novelina and Murray Collins**

1. Background

The United Nations Framework Convention on Climate Change (UNFCCC) mechanism for Reducing Emissions from Deforestation and Degradation in developing countries (REDD+) represents an unprecedented opportunity for the conservation of forest biodiversity. Nevertheless, there are widespread concerns surrounding the possibility of negative environmental outcomes if biodiversity is not given adequate consideration throughout the REDD+ process.

One of the most significant developments arising from the 2010 16th Conference of the Parties (COP 16) of the UNFCCC, was the adoption of a set of policy approaches and positive incentives to reduce greenhouse gas emissions through the conservation and management of forests in developing countries (the Cancun Agreements; Decision 1; Paragraphs 68–79 of COP 16, and associated annex). Commonly known as REDD+, this mechanism includes five sets of activities or interventions, namely; reducing emissions from deforestation, reducing emissions from forest degradation, conservation of (existing) forest carbon stocks, sustainable management of forests, and enhancement of forest carbon stocks (e.g. through regeneration and planting in previously forest land). Taken together this set of recommendations represents a major and positive shift in the attention given to the potential role of forests in the developing world (non-Annex 1 countries, UNFCCC) in helping to stabilize the global climate, and offers the prospect of unprecedented levels of funding for forest conservation. REDD+ also has the potential to deliver enormous benefits for biodiversity conservation because forests in the developing world harbor much of the world's terrestrial and freshwater biota, and are also threatened by ongoing forest clearance and degradation. As a result, REDD+ has generated significant attention in the conservation science community as well as within the Convention on Biological Diversity (CBD) itself (CBD, 2011a). However, despite this considerable potential, concerns have been raised about possible negative environmental outcomes of REDD+ if key safeguards are not observed and integrated into the design and implementation of REDD+ activities (Ghazoul et al., 2010; Harvey 2010, CBD, 2011a; Epple et al., 2011; Pistorius et al., 2011, Gardner et al, 2011). These concerns were formally recognized in the Cancun Agreements through the adoption of guidance and safeguards for policy approaches and positive incentives (Appendix 1 Decision 1/CP.16) which state that REDD+ activities should "Be consistent with the objective of environmental integrity and take into account the multiple functions of forests and other ecosystems" and, further "That actions are consistent with the

conservation of natural forests and biological diversity, ensuring that [REDD+ activities] are not used for the conversion of natural forests, but are instead used to incentivize the protection and conservation of natural forests and their ecosystem services, and to enhance other social and environmental benefits". Consideration of biodiversity can be incorporated into both sets of decisions using information on the spatial distribution of biodiversity and its threats, as well as known responses of species (or species group) to different forms of forest disturbance and management.

A key step in the initial planning and design of the REDD+ program is to decide upon priority regions for investment in emissions reductions through forest conservation and management, and the types of REDD+ activities that should be implemented in such regions (Meridian Institute, 2011). To maximize emissions reductions this task is guided by an assessment of historical emissions from deforestation and degradation and information on the distribution of existing carbon stocks, in addition to considerations of the effectiveness, cost, social implications and the feasibility of REDD+ implementation. In addition to such a strategic planning exercise, a carbon Monitoring, Reporting and Verification (MRV) system is needed to assess and verify greenhouse gas (GHG) emissions reductions and removals from the atmosphere due to human activities. The national MRV systems that are currently being developed

Berbak is one of two RAMSAR-listed sites in Indonesia. This swamp area is recognized as an extensive peat-swamp forest in the Pacific Realm (Mijn & Rahman 1992), although the northern and eastern parts of this area were cleared (along the Batang Hari River and a section of the coastal area). A prolonged drought in 1997 caused fires, mainly at the edges of Berbak peat-swamp forest around 18000 to 24000 ha. The fires which occurred in the middle part of the area were caused by Jelutung sap collectors. By the end of 1997, more than 32,000 ha of forest on the northwest edge of the area had been cleared or damaged through forest clearance and illegal logging in the buffer zone, irrigation systems surrounding the area and forest fire. The boundary area on the coastal side of Berbak has been converted into coconut plantation and settlement.

This area is important for swamp bird species, although more research is still needed. Storm's Stork *Ciconia stormi* has been recorded in Air Hitam Dalam (Silvius & Verheugt 1986), Jerdon's Baza *Aviceda jerdoni*, Wallace's Hawk-eagle *Spizaetus nanus*, Black Partridge *Melanoperdix nigra* and other hornbill species also exist in this area. Follow-up research for Air Hitam Dalam by Burn & Brickle (1992) confirmed the presence of Storm's Stork *Ciconia stormi*, Milky Stork *Mycterea cinerea*, and White-winged Duck *Cairina scutulata*.

The main purpose of this technical report is to assess the relationship between bird species diversity and REDD+, to create a bird species list, to assess species richness across forest classes and to assess the conservation importance of the area. The report also provides some suggestions on why bird biodiversity is an important consideration for inclusion in the planning, preparation, implementation, reporting, monitoring and verification of REDD+ activities, particularly their impact on bird biodiversity.

2. Methods

Bird surveys were conducted between the February - July 2011 in Berbak National Park and surroundings areas.

The Point Count method was used to observe, listen to and record the bird species that were found, either directly through bird sightings or indirectly through sound only. Observations were made at each of 5 sampling points for 30 minutes in the morning and afternoon. Bird species identification was confirmed using the "Birdlife Guide Book".

3. Results

3.1. Species Diversity and Richness

During six months of observations, 36 bird family species were identified covering 201 bird species. Bird families found included Ardeidae, Ciconiidae, Anatidae, Anhingidae, Rallidae, Accipitridae, Scolopacidae, Sternidae, Columbidae, Psittacidae, Cuculidae, Strigidae, Caprimulgidae, Apodidae, Hemiprocnidae, Hirundinidae, Meroppidae, Trogonidae, Alcedinidae, Eurylaimidae, Bucerotidae, Megalaimidae, Coraciidae, Picidae, Dicruridae, Pycnonotidae, Chloropseidae, Turdidae, Corvidae, Timaliidae, Silvidae, Muscicapidae, Sturniidae, Nectarinidae and Ploceidae. The number of bird species found to cover only 57% of the total 355 bird species thought to inhabit in Berbak National Park. See Appendix 1 for detail.

The highest mean number of bird species was found in primary forest with 80 species, 19 species in secondary forest, 53 species in coastal areas and 56 species in swamp bush habitat (ex forest fire in 1997). These findings indicate a decline in species richness due to deforestation and forest degradation resulting from forest fires. See Tables 1 and 2 for more detail.

Table 1: Species richness per land class is the total number of species counted in each land class.

Forest	Class
Number of Species	
Primary forest	161
Secondary forest	62
Swamp bush	42
Coastal Areas	51

Table 2: Mean species richness is the sum of the total number of species per plot divided by number of plots in each class.

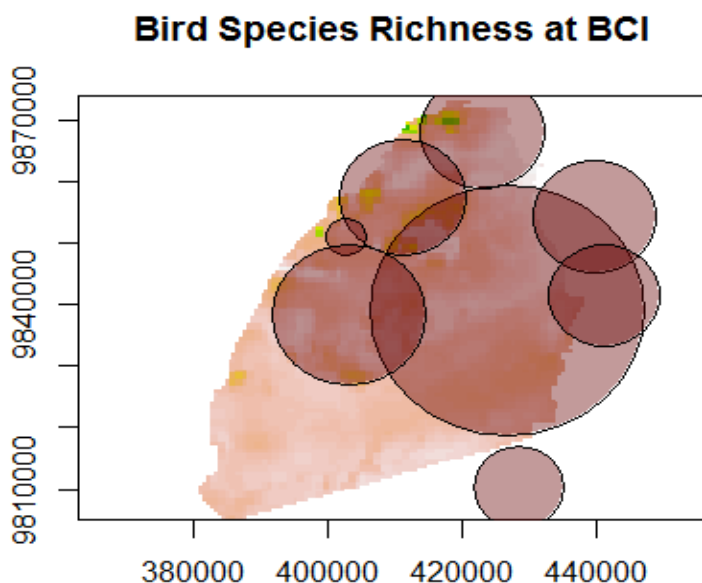
Forest Class	Number of Species
Primary	80
Coastal Areas	53
Secondary	19
Swamp Bush	56

Table 3: Number of birds recorded at each individual sampling point.

Forest Class	X	Y	Species Number
Primary	425808	9839085	125
Primary	422378	9868128	57
Primary	411110	9857549	58
Coastal Areas	438023	9854256	56
Coastal Areas	439339	9841597	51
Secondary	403186	9850930	19
Swamp Bush	403481	9838533	70
Swamp Bush	427469	9810152	42

Survey results show that the core area of Berbak National Park is the most important area for establishing bird species diversity in Berbak. Figure 1 shows the number of bird species counted at each individual location, represented graphically. The size of the circle represents the number of species counted. The background layer is a rasterised vegetation index, serving as a base layer for the map.

Figure 1: Bird species richness in Berbak Peat Swamp Forest.



3.2. Bird Conservation Status

The Berbak area was designated by Birdlife International as an Important Bird Area (IBA) in 2004. IBA recognition confirms Berbak as an area of international significance for bird conservation and confirmation of IBA status is used globally as a practical tool for conservation.

This research has recorded 8 species of birds which, following IBA classification guidelines, confirm Berbak as an A1 category area. These species are: Black Partridge *Melanoperdix niger*, White-winged Duck *Cairina scutulata*, Milky Stork *Mycteria cinerea*, Storm's Stork *Ciconia stormi*, Lesser Adjutant *Leptoptilos javanicus*, Spotted Greenshank *Tringa guttifer*, Silvery Wood-pigeon *Columba argentina*, Blue-banded Kingfisher *Alcedo euryzona*. An A1 rating is applied to regions which contain globally threatened species and are known, or thought regularly to host, significant numbers of a globally threatened species, or other species of global conservation concern. All species mentioned above are included in the IUCN Red List categorized as either vulnerable, endangered or critically endangered. See Table 4 and Appendix 1 for more detail.

Among the bird species recorded in this study, 79 species are protected by Indonesia Government Regulation No. 7 Year 1999 concerning Flora and Fauna Species Conservation. Bird species that are protected include *Accipitridae*, *Alcedinidae*, *Anhinga melanogaster*, *Bucerotidae*, *Cairina scutulata*, *Egretta spp.*, *Falconidae*, *Ibis cinereus*, *Anhinga melanogaster*, *Accipitridae* and *Sternidae*.

Table 4: IBA trigger bird species in the Berbak area

Bird Species	IBA Criteria	IUCN Category
Black Partridge <i>Melanoperdix niger</i>	A1	Vulnerable
White-winged Duck <i>Cairina scutulata</i>	A1	Endangered
Milky Stork <i>Mycteria cinerea</i>	A1	Vulnerable
Storm's Stork <i>Ciconia stormi</i>	A1	Endangered
Lesser Adjutant <i>Leptoptilos javanicus</i>	A1	Vulnerable
Spotted Greenshank <i>Tringa guttifer</i>	A1	Endangered
Silvery Wood-pigeon <i>Columba argentina</i>	A1	Critically Endangered
Blue-banded Kingfisher <i>Alcedo euryzona</i>	A1	Vulnerable

Based on the IUCN (International Union for Conservation of Nature) Red List of Threatened Species, of the total number of bird species known in Berbak National Park, 4 species are

classified Endangered (EN), 1 species is Critically Endangered (CR), 8 species are Vulnerable (V), 55 species are Less Concern (LC) and 5 species are Near Threatened (NT).

Furthermore, based on CITES classification (Convention on International Trade in Endangered Species of Wild Fauna and Flora), 5 bird species are included in Appendix 1 - species which are threatened with extinction and for which CITES prohibits international trade except when the purpose of the import is not commercial, for instance for scientific research. In these exceptional cases, trade may take place provided it is authorized by the granting of both an export permit and an import permit. Additionally, 36 species are listed as CITES Appendix 2 - species that are not necessarily currently threatened with extinction but that may become so unless trade is closely controlled. It also includes so-called "look-alike species", i.e. species of which the specimens in trade look like those of species listed for conservation reasons.

3.3. Bird Diversity and REDD+

This research concludes that Berbak swamp forests contain a high richness of bird species which are globally threatened and have a high conservation value. These results support the contention that the preparation and monitoring of REDD+ should consider bird species diversity factors in its design and implementation otherwise it will not provide the co-benefits for biodiversity as stipulated under REDD+.

We propose that bird biodiversity considerations can be readily incorporated into national REDD+ programs using a similar logic and framework to cover both planning and assessment. Moreover, we argue that some level of integration is essential if biodiversity considerations are to be viable within REDD+ planning for and assessment of both carbon and biodiversity. This would include preparatory "status" data (analyses of historical changes in forest area and condition, distribution of existing carbon stocks and the distribution of biodiversity and biodiversity threats), activity (land-use) data, and response factors (emissions factors or biodiversity disturbance responses). These inputs, together with a combined satellite and forest plot-based monitoring system can deliver integrated guidance on spatial land-use planning (i.e. which REDD+ activities to implement and where) and performance assessments (GHG emission assessment and estimates of change in the status of forest biodiversity). In an analogous way to carbon MRV, it is possible to identify different tiers of data requirement and analytical complexity for biodiversity assessments.

In spite of their recognized importance, there is an urgent need for clear operational guidance on how the biodiversity safeguards adopted by the Cancun Agreements can be integrated into REDD+ activities (as well as voluntary carbon projects) in practice. Both the UNFCCC and the CBD have made formal requests (through the Subsidiary Body for Scientific and Technical Advice; SBSTA, and COP 10 (Decision X/33 paragraph 9)) for advice on implementing biodiversity safeguards ahead of the UNFCCC COP 17 and CBD COP 11 in Durban (2011) and Hyderabad (2012) respectively.

In the context of considering the impacts of different REDD+ activities on biodiversity, for both planning and assessment it is important to understand how different REDD+ activities may impact (positively or negatively) on forest biodiversity, and their consequences for the

long-term integrity and conservation of forest ecosystems. The best available data should be used to assess the biodiversity impacts (positive or negative) of implementing different combinations of REDD+ activities. Many studies have compared changes in biodiversity following different types of tropical forest modification or conservation.

BERBAK BIRD SPECIES LIST

REMARKS :

IUCN (International Union for Conservation of Nature) RED LIST OF THREATENED SPECIES : LC : Less Concern, NT : Near Threatened, VU : Vulnerable, CR: Critically Endangered, EN Endangered, EW Extinct in the Wild, EX Extinct, DD : Data Deficient

CITES (Convention on International Trade in Endangered Species of Wild Fauna and Flora)

Appendix I lists species that are the most endangered among CITES-listed animals and plants (see Article II, paragraph 1 of the Convention). They are threatened with extinction and CITES prohibits international trade in specimens of these species except when the purpose of the import is not commercial (see Article III), for instance for scientific research. In these exceptional cases, trade may take place provided it is authorized by the granting of both an import permit and an export permit (or re-export certificate). Article VII of the Convention provides for a number of exemptions to this general prohibition.

Appendix II lists species that are not necessarily now threatened with extinction but that may become so unless trade is closely controlled. It also includes so-called "look-alike species", i.e. species of which the specimens in trade look like those of species listed for conservation reasons (see Article II, paragraph 2 of the Convention). International trade in specimens of Appendix-II species may be authorized by the granting of an export permit or re-export certificate. No import permit is necessary for these species under CITES (although a permit is needed in some countries that have taken stricter measures than CITES requires). Permits or certificates should only be granted if the relevant authorities are satisfied that certain conditions are met, above all that trade will not be detrimental to the survival of the species in the wild. (See Article IV of the Convention)

Appendix III is a list of species included at the request of a Party that already regulates trade in the species and that needs the cooperation of other countries to prevent unsustainable or illegal exploitation (see Article II, paragraph 3, of the Convention). International trade in specimens of species listed in this Appendix is allowed only on presentation of the appropriate permits or certificates. (See Article V of the Convention)

ENDEMIC BIRD AREAS (EBAs): Of the world's restricted-range bird species, only 7% of restricted-range species do not overlap with other such species and therefore do not occur in EBAs.

IMPORTANT BIRD AREAS (IBAs) : - Places of international significance for the conservation of birds and other biodiversity. - Recognised world-wide as practical tools for conservation - Distinct areas amenable to practical conservation action - Identified using standardised, agreed **criteria** - Sites that together form part of a wider, integrated approach to the conservation and sustainable use of the natural environment

A1. Globally threatened species: The site is known or thought regularly to hold significant numbers of a globally threatened species, or other species of global conservation concern.

A2. Restricted-range species: The site is known or thought to hold a significant component of a group of species whose breeding distributions define an Endemic Bird Area (EBA) or Secondary Area (SA).

A3. Biome-restricted species: The site is known or thought to hold a significant component of the group of species whose distributions are largely or wholly confined to one biome.

A4. Congregations : A site may qualify on any one or more of the four criteria listed i). Site known or thought to hold, on a regular basis, $\geq 1\%$ of a bio-geographic population of a congregatory waterbird species., ii). Site known or thought to hold, on a regular basis, $\geq 1\%$ of the global population of a congregator seabird or terrestrial species.

iii). Site known or thought to hold, on a regular basis, $\geq 20,000$ waterbirds or $\geq 10,000$ pairs of seabirds of one or more species. iv). Site known or thought to exceed thresholds set for migratory species at bottleneck sites.

P : Protected by Indonesia Law (Government Regulation No. 7 / 1999)

REFERENCES :

- 1 : Recent ZSL Survey (2011), 2 : Berbak Natioanal Park Bird List, Departement of Forestry (2001), 3. Bird Life International Important Bird Areas : Berbak, Bird Life International : Indonesia Country Profile . (2012)

NO	FAMILY NAME	COMMON NAME	SCIENTIFIC NAME	REFERENCE	CONSERVATION STATUS			
					CITES	IUCN RED LIST	Protected by Indonesia Law	Important Bird Area (IBA) / Endemic Bird Area (EBA)
1	Phalacrocoracidae	Little cormorant	<i>Phalacrocorax niger</i>	2		LC		
2	Anhingidae	Oriental darter	<i>Anhinga melanogaster</i>	1,2,3			P	
3	Fregatidae	Lesser frigatebird	<i>Fregata ariel</i>	2		LC		
4		Great frigatebird	<i>Fregata minor</i>	3		LC		
5	Ardeidae	Grey heron	<i>Ardea cinerea</i>	1,2,3		LC		
6		Great billed heron	<i>Ardea Sumatrana</i>	1,2,3				
7		Purple heron	<i>Ardea purpurea</i>	1,2,3		LC		
8		Striated heron	<i>Butorides striatus</i>	1,2,3				
9		Japan pond heron	<i>Ardeola speciosa</i>	2				
10		Cattle egret	<i>Bubulcus ibis</i>	1,2,3			P	
11		Great alba	<i>Egretta alba</i>	1,2,3			P	
12		Intermediate egret	<i>Egretta intermedia</i>	1,2,3			P	
13		Little egret	<i>Egretta garzetta</i>	1,2,3			P	
14		Chinese egret	<i>Egretta eulophotes</i>	2			P	
15		Pacific reef egret	<i>Egretta sacra</i>	2		LC	P	
16		Black crowned night heron	<i>Nycticorax nycticorax</i>	2				
17		Cinnamon bittern	<i>Ixobrychus cinnamomeus</i>	1,2,3				
18		Black bittern	<i>Dupetor flavicollis</i>	1,2,3				
19		Yellow bittern	<i>Ixobrychus sinensis</i>	2		V		A1
20	Ciconiidae	Lesser adjutant	<i>Leptoptilos javanicus</i>	1	App I	V		A1

NO	FAMILY NAME	COMMON NAME	SCIENTIFIC NAME	REFERENCE	CONSERVATION STATUS			
					CITES	IUCN RED LIST	Protected by Indonesia Law	Important Bird Area (IBA) / Endemic Bird Area (EBA)
21		Milky stork	<i>Mycteria cinerea</i>	1		V		A1
22		Strom's strork	<i>Ciconia stormi</i>	1		EN		
23		Black necked stork	<i>Ephippiorhynchus asiaticus</i>	1				
24		Woolly necked stork	<i>Ciconia episcopus</i>	1	App II	LC	P	
25			<i>Ibis cinereus</i>	1	App II		P	
26	Anatidae	Sunda teal	<i>Anas gibberifrons</i>	1,2,3				
27		Lesser whisting duck	<i>Dendrocygna javanica</i>	1,2,3	App I	EN		A1
28		White winged wood-duck	<i>Cairina scutulata</i>	1,2,3	App II	EN	P	
29	Pandionidae	Osprey	<i>Pandion haliaetus</i>	2	App II			
30	Accipitridae	Brahminy kite	<i>Halistur indus</i>	1,2,3	App II		P	
31		Black eagle	<i>Ictinaetus malayensis</i>	1,2,3	App II		P	
32		Crested serpent eagle	<i>Spilornis cheela</i>	1,2,3	App II		P	
33		Bat hawk	<i>Macheiramphus alcinus</i>	1,2,3	App II		P	
34		Black winged kite	<i>Elanus caeruleus</i>	1,2,3	App II		P	
35		White billedfish-eagle	<i>Haliaetus leucogaster</i>	1,2,3			P	
36		Lesser fish-eagle	<i>Ichthyopagha humilis</i>	1,2,3	App II		P	
37		Changeable hawk-eagle	<i>Spizaetus cirrhatus</i>	1,2,3	App II	V	P	
38		Wallace's hawk-eagle	<i>Spizaetus nanus</i>	1,2,3	App II	LC	P	
39		Grey headed fish eagle	<i>Ichthyophaga ichthyaetus</i>	1,2,3	App II		P	
40		Crested goshawk	<i>Accipiter trivigatus</i>	1,2,3	App II		P	

NO	FAMILY NAME	COMMON NAME	SCIENTIFIC NAME	REFERENCE	CONSERVATION STATUS			
					CITES	IUCN RED LIST	Protected by Indonesia Law	Important Bird Area (IBA) / Endemic Bird Area (EBA)
41		Besra	<i>Accipiter virgatus</i>	2	App II	LC	P	
42		Jerdons baza	<i>Aviceda jerdoni</i>	2	App II		P	
43		Black baza	<i>Aviceda leuphotes</i>	2	App II		P	
44		Common buzzard	<i>Buteo buteo</i>	2			P	
45		Oriental honey buzzard	<i>Pernis ptilorhynchus</i>	2	App II		P	
46		Blyths Hawk eagle	<i>Spizaetus alboniger</i>	2	App II		P	
47	Falconidae	Spotted kestrel	<i>Falco molucensis</i>	2	App II		P	
48		Oriental; hobby	<i>Falco severus</i>	1			P	
49			<i>Microhierax fringillarius</i>	1			P	
50	Phasianidae	Great argus	<i>Argusianus argus</i>	2		NT	P	
51		Blue breasted quail	<i>Cotumix chinensis</i>	1				
52		Red jungle fowl	<i>Gallus gallus</i>	1		LC	P	
53		Black partridge	<i>Melanoperdix nigra</i>	1		V		
54	Rallidae	White breasted waterhen	<i>Amaurornis phaeincurus</i>	1,2,3				
55		Baillons crane	<i>Porzana pusilla</i>	1,2,3				
56		White browed crane	<i>Porzana cinerea</i>	2				
57		Ruddy breasted crane	<i>Porzana fusca</i>	2		LC		
58		Band bellied crane	<i>Porzana paykullii</i>	2				
59		Red legged crane	<i>Rallina fasciata</i>	2				
60		Water cock	<i>Gallinula cinerea</i>	2				
61		Common moorhen	<i>Gallinula chloropus</i>	2				

NO	FAMILY NAME	COMMON NAME	SCIENTIFIC NAME	REFERENCE	CONSERVATION STATUS			
					CITES	IUCN RED LIST	Protected by Indonesia Law	Important Bird Area (IBA) / Endemic Bird Area (EBA)
62		Purple swamphen	<i>Porphyrio porphyrio</i>	2				
63	Jacaniidae	Pheasant tailed jacana	<i>Hydrophasianus chirurgus</i>	2				
64	Charadriidae	Pacific golden plover	<i>Pluvialis fulva</i>	1,2,3				
65		Kentish plover	<i>Charadrius alexandrinus</i>	1,2,3				
66		Malaysian plover	<i>Charadrius peronii</i>	1,2,3				
67		Lesser sand plover	<i>Charadrius mongolus</i>	1,2,3				
68		Greater sand plover	<i>Charadrius leschenaultii</i>	1,2,3				
69		Oriental plover	<i>Charadrius veredus</i>	1,2,3				
70		Little ringed Plover	<i>Charadrius dubius</i>	2				
71			<i>Pluvialis dominica</i>	2				
72		Grey plover	<i>Pluvialis squatarola</i>	2				
73	Scolopacidae	Eurasian curlew	<i>Numenius arquata</i>	1,2,3		NT		
74		Whimbrel	<i>Numenius phaeopus</i>	1,2,3		LC		
75		Black-tailed godwit	<i>Limosa limosa</i>	1,2,3		NT		
76		Bar-tailed godwit	<i>Limosa lapponica</i>	1,2,3		LC		
77		Asian dowitcher	<i>Limnodromus semipalmatus</i>	1,2,3				
78		Common redshank	<i>Tringa totanus</i>	1,2,3		LC		
79		Marsh sandpiper	<i>Tringa stagnatilis</i>	1,2,3		LC		
80		Wood sandpiper	<i>Tringa glareola</i>	1,2,3		LC		
81		Green sandpiper	<i>Tringa flavipes</i>	1,2,3	App I			A1
82		Nordmann's Greenshank	<i>Tringa guttifer</i>	1,2,3		EN	P	

NO	FAMILY NAME	COMMON NAME	SCIENTIFIC NAME	REFERENCE	CONSERVATION STATUS			
					CITES	IUCN RED LIST	Protected by Indonesia Law	Important Bird Area (IBA) / Endemic Bird Area (EBA)
83		Terek sandpiper	<i>Xenus cinereus</i>	1,2,3		LC		
84		Common sandpiper	<i>Actitis hypoleucos</i>	1,2,3		LC		
85		Ruddy turnstone	<i>Arenari interpres</i>	2		LC		
86		Rufous necked stint	<i>Calidris ruficollis</i>	2		LC		
87		Curlew sandpiper	<i>Calidris feruginea</i>	2		LC		
88		Great knot	<i>Calidris tenuirostris</i>	2		V		
89			<i>Heteroscelus brevipes</i>	2		LC		
90		Broad billed sandpiper	<i>Limicola falcinellus</i>	2		LC		
91		Black tailed godwit	<i>Limosa limosa</i>	2		LC		
92		Far eastern curlew	<i>Numenius madagascariensis</i>	2				
93			<i>Tringa nebularia</i>	2				
94	Stercorariidae	Pomarine jaeger	<i>Stercorarius pomarinus</i>	1,2,3				
95		Whiskered tern	<i>Chidonias hybridus</i>	1,2,3				
96		White winged tern	<i>Chidonias leucopterus</i>	1,2,3				
97		Gull billed tern	<i>Gelochelidon nilotica</i>	1,2,3				
98		Bridled tern	<i>Stema anaethetus</i>	1,2,3				
99		Lesser crested tern	<i>Stema bengalensis</i>	1,2,3		LC		
100		Roseate tern	<i>Stema dougallii</i>	1,2,3				
101		Sooty tern	<i>Stema fuscata</i>	1,2,3				
102		Black naped tern	<i>Stema sumatrana</i>	1,2,3		LC		
103	Laridae	Common black headed gull	<i>Larus ridibundus</i>	2				

NO	FAMILY NAME	COMMON NAME	SCIENTIFIC NAME	REFERENCE	CONSERVATION STATUS			
					CITES	IUCN RED LIST	Protected by Indonesia Law	Important Bird Area (IBA) / Endemic Bird Area (EBA)
104	Glareolidae	Oriental pratiacole	<i>Glareola maldivarum</i>	2				
105	Sternidae	Gull-billed tern	<i>Sterna nilotica</i>	1,2,3		LC	P	
106		Caspian tern	<i>Sterna caspia</i>	1,2,3		LC	P	
107		Common tern	<i>Sterna hirundo</i>	1,2,3		LC	P	
108		Swift tern	<i>Sterna bergii</i>	1,2,3		LC	P	
109		Little tern	<i>Sterna albifrons</i>	1,2,3		LC	P	
110	Columbidae	Spotted Dove	<i>Streptopelia chinensis</i>	1,2,3				
111		Zebra-dove	<i>Geopelia striata</i>	1,2,3				
112		Green-pigeon species	<i>Treron spp.</i>	1,2,3				
113		Little green pigeon	<i>Treron olax</i>	1,2,3				
114		Thick billed green pigeon	<i>Treron curvirostra</i>	1,2,3		LC		
115		Pink-necked green pigeon	<i>Treron vernans</i>	1,2,3		LC		
116		Cinnamon-headed green pigeon	<i>Treron fulvicollis</i>	1,2,3				
117		Mountain imperial pigeon	<i>Ducula badia</i>	1,2,3		LC		
118		Green imperial-pigeon	<i>Ducula aenea</i>	1,2,3		LC		A1
119		Silverywood pigeon	<i>Columba argentina</i>	1,2,3		CR		EBA
120		Emerald dove	<i>Chalophaps indica</i>	1,2,3				
121		Pied imperial pigeon	<i>Ducula bicolor</i>	2		LC		
122		Barred cuckoo dove	<i>Macropygia unchall</i>	2				

NO	FAMILY NAME	COMMON NAME	SCIENTIFIC NAME	REFERENCE	CONSERVATION STATUS			
					CITES	IUCN RED LIST	Protected by Indonesia Law	Important Bird Area (IBA) / Endemic Bird Area (EBA)
123		Island collared dove	<i>Streptopelia bitorquata</i>	2	App II			
124	Psittacidae	Blue-crowned hanging parrot	<i>Loriculus galgulus</i>	1,2,3	App II	LC		
125		Blue-rumped parrot	<i>Psittinus cyanurus</i>	1,2,3	App II			
126		Red breasted parakeet	<i>Psittacula alexandri</i>	1,2,3	App II			
127		Long-tailed parakeet	<i>Psittacula longicauda</i>	1,2,3				
128	Cuculidae	Greater coucal	<i>Centropus sinnensis</i>	1,2,3				
129		Lesser coucal	<i>Centropus bengalensis</i>	1,2,3				
130		Black bellied malkoha	<i>Phaenicophaeus diardi</i>	1,2,3				
131		Asian koel	<i>Eudynamys scolapacea</i>	1,2,3				
132		Chestnut winged cuckoo	<i>Clamator coromandus</i>	2				
133		Hodgsons hawk cuckoo	<i>Cuculus fugax</i>	2				
134		Indian cuckoo	<i>Cuculus micropterus</i>	2				
135		Plaintive Cuckoo	<i>Cocomantis merulinus</i>	2				
136		Violet cuckoo	<i>Chrysococcyx xanthorhynchus</i>	2				
137		Drongo cuckoo	<i>Surniculus lugubris</i>	2				
138		Chestnut bellied malkoha	<i>Phaenicophaeus sumatranus</i>	2				
139		Raffles's malkoha	<i>Phaenicophaeus chlorophaeus</i>	2				

NO	FAMILY NAME	COMMON NAME	SCIENTIFIC NAME	REFERENCE	CONSERVATION STATUS			
					CITES	IUCN RED LIST	Protected by Indonesia Law	Important Bird Area (IBA) / Endemic Bird Area (EBA)
140		Chestnut breasted malkoha	<i>Phaenicophaeus curvirostris</i>	2	App II			
141	Strigidae	Barn owl	<i>Tyto alba</i>	1,2,3	App II			
142		Brown Hawk owl	<i>Ninox scutulata</i>	1,2,3				
143		Stresemann's scops owl	<i>Otus stresemanni</i>	1,2,3	App II			
144		Reddishscops-owl	<i>Otus rufescens</i>	1,2,3				
145		Barred eagle owl	<i>Bubo sumatranus</i>	2	App II			
146		Buffy fish owl	<i>Ketupa ketupu</i>	2	App II			
147		<i>Ottus bakkamoena</i>	<i>Ottus bakkamoena</i>	2				
148	Caprimulgidae	Malaysian eared nightjar	<i>Eurostopodus temminckii</i>	1,2,3				
149		Great eared nightjar	<i>Eurostopodus macrotis</i>	1,2,3				
150		Savanah nightjar	<i>Caprimulgus affinis</i>	2				
151		Large tailed nightjar	<i>Caprimulgus macrurus</i>	2				
152	Apodidae	Edible-nest swiftlet	<i>Collocalia fuciphaga</i>	1,2,3		LC		
153		Black-nest swiftlet	<i>Collocalia maxima</i>	1,2,3		LC		
154		Glossy swiftlet	<i>Collocalia esculenta</i>	1,2,3		LC		
155		Giant Swiftlet	<i>Hydrochous gigas</i>	1,2,3				
156		Asian palm-swift	<i>Cypsiurus balasiensis</i>	1,2,3				
157		Silver-backed Needletail	<i>Hyrundapus cochinhinensis</i>	1,2,3				
158		Brown backed netletail	<i>Hirundapus giganteus</i>	2				
159		Fork tailed swift	<i>Apus pacificus</i>	2		LC		

NO	FAMILY NAME	COMMON NAME	SCIENTIFIC NAME	REFERENCE	CONSERVATION STATUS			
					CITES	IUCN RED LIST	Protected by Indonesia Law	Important Bird Area (IBA) / Endemic Bird Area (EBA)
160		Little swift	<i>Apus affinis</i>	2				
161	Hemiprocnidae	Whiskered treeswift	<i>Hemiproctne comate</i>	1,2,3				
162		Grey rumped treeswift	<i>Hemiproctne longipennis</i>	2				
163	Trogonidae	Scarlet-rumped trogon	<i>Harpacted duvaucelii</i>	1,2,3			P	
164		Diards trogon	<i>Harpactes diardii</i>	2			P	
165	Alcedinidae	Blue-eared kingfisher	<i>Alcedo meninting</i>	1,2,3			P	
166		Stork billed kingfisher	<i>Pelargopsis capensis</i>	1,2,3			P	
167		White throated Kingfisher	<i>Halcyon smynensis</i>	1,2,3			P	
168		Black capped Kingfisher	<i>Halcyon pileata</i>	1,2,3			P	
169		Collared Kingfisher	<i>Todirhamphus chloris</i>	1,2,3			P	
170		Rufous collared kingfisher	<i>Actenoides concretus</i>	1,2,3			P	
171		Common kingfisher	<i>Alcedo atthis</i>	2		V	P	
172		Blue banded kingfisher	<i>Alcedo euryzonia</i>	2		V	P	
173		Black backed kingfisher	<i>Ceyx erithacus</i>	2			P	
174		Rufous backed kingfisher	<i>Ceyx rufidorsa</i>	2			P	
175			<i>Halcyon chloris</i>	2			P	
176			<i>Halcyon concreta</i>	2			P	
177		Ruddy kingfisher	<i>Halcyon coromanda</i>	2			P	

NO	FAMILY NAME	COMMON NAME	SCIENTIFIC NAME	REFERENCE	CONSERVATION STATUS			
					CITES	IUCN RED LIST	Protected by Indonesia Law	Important Bird Area (IBA) / Endemic Bird Area (EBA)
178	Meropidae	Blue tailed bee-eater	<i>Merops philippinus</i>	1,2,3				
179		Blue throated bee-eater	<i>Merops viridis</i>	1,2,3				
180	Coraciidae	Dollarbird	<i>Eurystomus orientalis</i>	1,2,3	App II	LC		
181	Bucerotidae	Black hornbill	<i>Anthracoceros malayanus</i>	1,2,3	App II	LC	P	
182		Oriental pied hornbill	<i>Anthracoceros albirostris</i>	1,2,3	App II		P	
183		Rhinoceros hornbill	<i>Buceros rhinoceros</i>	2	App I	NT	P	
184		Helmeted hornbill	<i>Rhinoplax vigil</i>	1,2,3			P	
185		Bushy crested hornbill	<i>Anorrhinus galeritus</i>	2	App II		P	
186			<i>Anthracoceros convexus</i>	2	App II		P	
187			<i>Anthracoceros coronatus</i>	2			P	
188			<i>Berenicomis comatus</i>	2	App I		P	
189		Great hornbill	<i>Buceros bicornis</i>	2		NT	P	
190			<i>Rhyticeros corrugatus</i>	2			P	
191			<i>Rhyticeros undulatus</i>	2			P	
192	Capitonidae	Lineated barbet	<i>Megalaima lineate</i>	2				
193		Red throated barbet	<i>Megalaima mystacophanos</i>	1				

NO	FAMILY NAME	COMMON NAME	SCIENTIFIC NAME	REFERENCE	CONSERVATION STATUS			
					CITES	IUCN RED LIST	Protected by Indonesia Law	Important Bird Area (IBA) / Endemic Bird Area (EBA)
194	Megalaimidae	Coppersmith barbet	<i>Megalaima haemacephala</i>	1,2,3				
195		Gold whiskered barbet	<i>Megalaima chrisopogon</i>	1,2,3				
196		Blue eared Barbet	<i>Megalaima australis</i>	1,2,3		LC		
197		Red-crowned barbet	<i>Megalaima raflesii</i>	1,2,3				
198		Brown barbet	<i>Calorhampus fuliginosus</i>	1,2,3				
199	Picidae	Common goldenback	<i>Dinopium javanense</i>	1,2,3				
200		Rufous woodpecker	<i>Celeus brachyurus</i>	1,2,3				
201		White-bellied woodpecker	<i>Dryacapus javensis</i>	1,2,3				
202		Crimson winged woodpecker	<i>Picus puniceus</i>	1,2,3				
203		Buff necked woodpecker	<i>Meiglyptes tukki</i>	1,2,3				
204		Orange backed woodpecker	<i>Reinwardtipicus validus</i>	1,2,3				
205		Speckled piculet	<i>Picumnus innominatus</i>	2				
206		Checker throated woodpecker	<i>Picus mentalis</i>	2				
207		Banded woodpecker	<i>Picus miniaceus</i>	2				
208		Great slaty woodpecker	<i>Mulleripicus pulverulentus</i>	2				
209		Fulvous breasted woodpeckers	<i>Picoides macei</i>	2				

NO	FAMILY NAME	COMMON NAME	SCIENTIFIC NAME	REFERENCE	CONSERVATION STATUS			
					CITES	IUCN RED LIST	Protected by Indonesia Law	Important Bird Area (IBA) / Endemic Bird Area (EBA)
210		Grey capped woodpecker	<i>Picoides canicapillus</i>	2				
211		Sunda woodpeckers	<i>Picoides moluccensis</i>	2				
212		Grey and buff woodpecker	<i>Hemicircus concretus</i>	2				
213		Maroon woodpecker	<i>Blythipicus rubiginosus</i>	2				
214		Greater goldenback	<i>Chrysocolaptes lucidus</i>	2				
215			<i>Blythipicus pyrrhotis</i>	2				
216	Eurylaimidae	Dusky broadbill	<i>Corydon sumatranus</i>	1,2,3				
217		Black and red broadbill	<i>Cymbirhynchus macrorhynchos</i>	1,2,3				
218		Banded broadbill	<i>Eurylaimus javanicus</i>	2				
219		Black and yellow broadbill	<i>Eurylaimus ochromalus</i>	2				
220	Hirundinidae	Barn swallow	<i>Hirundo rustica</i>	1,2,3				
221		Pacific swallow	<i>Hirundo tahitica</i>	1,2,3				
222	Campephagidae	Bar winged flycatcher shrike	<i>Hemipus hirundinaceus</i>	3				
223		Pied triller	<i>Lalage nigra</i>	1				
224		Small minivet	<i>Pericrocotus cinnamomeus</i>	1				
225		Scarlet minivet	<i>Pericrocotus flammeus</i>	1				
226		Tiery minivet	<i>Pericrocotus igneus</i>	1				
227	Chloropseidae	Common lora	<i>Aegithina tiphia</i>	2				

NO	FAMILY NAME	COMMON NAME	SCIENTIFIC NAME	REFERENCE	CONSERVATION STATUS			
					CITES	IUCN RED LIST	Protected by Indonesia Law	Important Bird Area (IBA) / Endemic Bird Area (EBA)
228		Lesser green leafbird	<i>Chloropsis cyanopogon</i>	1,2,3				
229		Greater green leafbird	<i>Chloropsis sonnerati</i>	1,2,3				
230		Blue winged leafbird	<i>Chloropsis cochinchinensis</i>	1				
231		<i>Aegithina lafresnayei</i>	<i>Aegithina lafresnayei</i>	2				
232	Pycnonotidae	Yellow-vented bulbul	<i>Pycnonotus goiavier</i>	1,2,3				
233		Scooty-headed Bulbul	<i>Pycnonotus aurigaster</i>	1,2,3		LC		
234		Black-headed bulbul	<i>Pycnonotus atriceps</i>	1,2,3				
235		Cream vanted bulbul	<i>Pycnanotus simplex</i>	1,2,3		LC		
236		Red-eyed bulbul	<i>Pycnonotus brunneus</i>	1,2,3		LC		
237		Olive-winged bulbul	<i>Pycnonotus plumosus</i>	1,2,3		LC		
238		Spectacted bulbul	<i>Pycnonotus erhythrophthalmos</i>	1,2,3		LC		
239		Yellow billied bulbul	<i>Alophoixus phaeocephalus</i>	1,2,3		LC		
240			<i>Criniger phaeocephalus</i>	1				
241			<i>Hypsipetes charlottae</i>	1				
242			<i>Tricholestes ciniger</i>	1		LC		
243		Puff backed bulbul	<i>Pycnonotus eotilotus</i>	2				
244	Dicruridae	Sumatran drongo	<i>Dicrurus sumatranus</i>	1,2,3				
245		Greater racket tailed drongo	<i>Dicrurus paradiseus</i>	1,2,3				

NO	FAMILY NAME	COMMON NAME	SCIENTIFIC NAME	REFERENCE	CONSERVATION STATUS			
					CITES	IUCN RED LIST	Protected by Indonesia Law	Important Bird Area (IBA) / Endemic Bird Area (EBA)
246		Bronzed drongo	<i>Dicrurus aeneus</i>	2				
247		Crow billed drongo	<i>Dicrurus annectans</i>	2				
248		Lesser racket tailed drongo	<i>Dicrurus remifer</i>	2				
249	Oriolidae	Black naped oriole	<i>Oriolus chinensis</i>	1,2,3				
250	Irenidae	Asian fairy bluebird	<i>Irena puella</i>	2				
251	Corvidae	Large-billed crow	<i>Corvus macrorhynchos</i>	1,2,3				
252		Slender billed crow	<i>Corvus enca</i>	1,2,3	App II			
253		<i>Platysmurus leucopterus ?</i>	<i>Platysmurus leucopterus</i>	1				
254	Sittidae	Velvet fronted nuthatch	<i>Sitta frontalis</i>	2				
255	Timaliidae	Stripped tit-babbling	<i>Macronous gularis</i>	1,2,3				
256		Chesnut wnd babbler	<i>Stachyris erythroptera</i>	1,2,3				
257		Sooty capped babbler	<i>Malacopteron affine</i>	1,2,3		LC		
258		White chested babbler	<i>Trichastoma rostratum</i>	1,2,3				
259		Black capped babbler	<i>Pellomeum capistratum</i>	2		LC		
260			<i>Trichastoma bicolor</i>	2				
261			<i>Trichastoma malaccense</i>	2		LC		
262		Grey breasted babbler	<i>Malacopteron albobulare</i>	2				
263		Chestnut rumped babbler	<i>Stachyris maculate</i>	2				

NO	FAMILY NAME	COMMON NAME	SCIENTIFIC NAME	REFERENCE	CONSERVATION STATUS			
					CITES	IUCN RED LIST	Protected by Indonesia Law	Important Bird Area (IBA) / Endemic Bird Area (EBA)
264		Fluffy backed tit babler	<i>Macronous ptilosus</i>	2				
265		White crested laughingthrush	<i>Garrulax leucolophus</i>	2				
266			<i>Erithacus cyane</i>	2				
267	Turdidae	Magpie robin	<i>Copsychus saularis pluto</i>	1,2,3				
268		White rumped shama	<i>Copsychus malabericus</i>	1,2,3				
269		Rufous tailed shama	<i>Trichixos pyrhopygus</i>	1,2,3				
270	Sylviidae	Rufous tale tailorbird	<i>Orthotomus sericeus</i>	1,2,3				
271		Ashy tailorbird	<i>Orthotomus ruficeps</i>	1,2,3				
272		Dark necked tailorbird	<i>Orthotomus atrogularis</i>	1,2,3				
273		Yellow bellied Prinia	<i>Prinia flaviventris</i>	1,2,3				
274		Bar winged prinia	<i>Prinia familiaris</i>	1,2,3				
275		Sunda warbler	<i>Seicercus grammiceps</i>	2				
276		Olive backed tailorbird	<i>Orthotomus sepium</i>	2				
277		Rufous tailed tailorbird	<i>Orthotomus sericeus</i>	2				
278		Zitting cisticola	<i>Cisticola juncidis</i>	2				
279			<i>Ficedula werstermanni</i>	2				
280			<i>Prinia subflava</i>	2				
281			<i>Rhynomyias umbratilis</i>	2				

NO	FAMILY NAME	COMMON NAME	SCIENTIFIC NAME	REFERENCE	CONSERVATION STATUS			
					CITES	IUCN RED LIST	Protected by Indonesia Law	Important Bird Area (IBA) / Endemic Bird Area (EBA)
282			<i>Acrocephalus arundinaceus</i>	2				
283	Muscicapidae	Yellow rumped flycatcher	<i>Ficedula zanthopygia</i>	1,2,3				
284		Mangrove flycatcher	<i>Cyornis rufigastra</i>	1,2,3				
285		Grey chested flycatcher	<i>Rhinomyias umbratilis</i>	1,2,3				
286		Mugimaki flycatcher	<i>Ficedula mugimaki</i>	1,2,3				
287		Pied fantail	<i>Rhipidura javanica</i>	1,2,3				
288		Black naped monarch	<i>Hypothymis azurea</i>	1,2,3				
289		Asian paradise flycatcher	<i>Tersiphone paradise</i>	1,2,3				
290		Malaysian blue flycatcher	<i>Cyornis turcosa</i>	2				
291	Rhipiduridae	White troated fantail	<i>Rhipidura albicollis</i>	2				
292		Sported fantail	<i>Rhipidura perlata</i>	1				
293	Monarchidae		<i>Hypothymis azurea</i>	2				
294		Rufous winged	<i>Philentoma pyrrhoptera</i>	1				
295			<i>Terpsiphone paradisi</i>	1				
296	Motacillidae	Grey wagtail	<i>Motacilla cinerea</i>	1,2,3				
297		Forest wagtail	<i>Dendronanthus indicus</i>	1,2,3				
298		Common pipit	<i>Anthus novaeseelandiae</i>	1,2,3				
299	Artamidae	White breasted wood swallow	<i>Artamus leucorhynchus</i>	1,2,3				

NO	FAMILY NAME	COMMON NAME	SCIENTIFIC NAME	REFERENCE	CONSERVATION STATUS			
					CITES	IUCN RED LIST	Protected by Indonesia Law	Important Bird Area (IBA) / Endemic Bird Area (EBA)
300	Laniidae	Long tailed shrike	<i>Lanius schach</i>	1,2,3				
301		Tiger shrike	<i>Lanius triginus</i>	2				
302	Sturniidae	Asian glossy starling	<i>Aplonis panayensis</i>	1,2,3	App II			
303		Common hill myna	<i>Gracula religiosa</i>	1,2,3				
304		Javan myna	<i>Acridotheres javanicus</i>	1,2,3				
305		Crested myna	<i>Acridotheres cristatellus</i>	1,2,3				
306		Common myna	<i>Acridotheres tristis</i>	2				
307	Nectariniidae	Plain Sunbird	<i>Anthreptes simplex</i>	1,2,3			P	
308		Ruby-cheeked Sunbird	<i>Anthreptes singalensis</i>	1,2,3			P	
309		Brown-throated Sunbird	<i>Anthreptes malacensis</i>	1,2,3			P	
310		Olive-backed Sunbird	<i>Nectarinia jugularis</i>	1,2,3			P	
311		Purple throated sunbird	<i>Nectarinia sperata</i>	1,2,3			P	
312		Copper throated sunbird	<i>Nectarinia calostecha</i>	1,2,3			P	
313		Purple naped sunbird	<i>Hypogramma hypogrammicum</i>	1,2,3			P	
314		Little spiderhunter	<i>Rachnothera longirostra</i>	1,2,3			P	
315		Long billed spiderhunter	<i>Arachnothera robusta</i>	1,2,3			P	
316		Red throated sunbird	<i>Anthreptes rhodolaena</i>	2			P	
317		Crimson sunbird	<i>Aethopyga siparaja</i>	2			P	

NO	FAMILY NAME	COMMON NAME	SCIENTIFIC NAME	REFERENCE	CONSERVATION STATUS			
					CITES	IUCN RED LIST	Protected by Indonesia Law	Important Bird Area (IBA) / Endemic Bird Area (EBA)
318		Thick billed spiderhunter	<i>Arachnothera crassirostris</i>	2			P	
319		Spectacled spiderhunter	<i>Arachnothera flavigaster</i>	2			P	
320		Yellow eared spiderhunter	<i>Arachnothera chrysogenys</i>	2			P	
321		Grey breasted spiderhunter	<i>Arachnothera affinis</i>	2			P	
322	Dicaeidae	Orange bellied flowerpecker	<i>Dicaeum trigonostigma</i>	1,2,3			P	
323		Yellow breasted flowerpecker	<i>Prionochilus maculates</i>	2				
324		Crimson breasted flowerpecker	<i>Prionochilus percussus</i>	2				
325		Scalet backed flowerpecker	<i>Dicaeum cruentatum</i>	2				
326	Zosteropidae	Oriental white eye	<i>Zosterops palpebrosus</i>	1,2,3				
327	Passeridae	Eurasian tree sparrow	<i>Passer montanus</i>	1,2,3				
328	Ploceidae	Eurasian tree sparrow	<i>Passer montanus</i>	1,2,3				
329		Baya weaver	<i>Ploceus philipinus</i>	1,2,3				
330		Scaly breasted munia	<i>Lonchura punctulata</i>	1,2,3				
331		White breasted munia	<i>Lonchura maja</i>	1,2,3				
332		Streaked weaver	<i>Ploceus manyar</i>	2				
333	Aegithinidae		<i>Aegithina tiphia</i>	1				

NO	FAMILY NAME	COMMON NAME	SCIENTIFIC NAME	REFERENCE	CONSERVATION STATUS			
					CITES	IUCN RED LIST	Protected by Indonesia Law	Important Bird Area (IBA) / Endemic Bird Area (EBA)
334	Pachycephalidae		<i>Pachycephala cinerea</i>	2		LC		
335	Threskiornithidae		<i>Threskiomis melanocephalus</i>	2				

NOTES ON THE EARLY NORTHWARD MIGRATION OF SUMATRAN WADERS ON THE EAST COAST OF JAMBI PROVINCE, INDONESIA, IN 2011

MUHAMMAD IQBAL¹, DOLLY PRIATNA² & RAHMAN DEDI²

¹GIZ-MRPP (German International Cooperation-Merang REDD Pilot Project),

Jl. Jendral Sudirman No. 2837 km 3,5 Palembang 30129, Indonesia; kpbsos26@yahoo.com

²Zoological Society of London-Indonesia Programme, Jl. Burangrang No. 18, Bogor 16151, Indonesia

A wader population survey of Cemara and Air Hitam Laut beaches on the east coast of Jambi, central Sumatra, Indonesia was carried out during early northward migration (1st March 2011). A total of 4,144 waders was counted, comprising 15 species. Black-tailed Godwit was the most abundant species (48.43% of total count), followed by Bar-tailed Godwit (19.3%), Terek Sandpiper (6.86%) and Lesser Sand Plover (6.75%). The number of Black-tailed Godwit in this survey reached more than 1% of the population estimate of waders for the East Asian-Australasian Flyway. It is confirmed that the east coast of Jambi province provides important habitat for Black-tailed Godwit and is also an important non-breeding area of waders in East Asian-Australasian Flyway.

INTRODUCTION

A high diversity and large numbers of waders have been recorded on the mudflats of the east coast of Jambi Province, Sumatra, Indonesia (Silvius & Verheught 1986, Silvius 1987, Silvius 1988, Danielsen & Skov 1989, Noni & Londo 2008, Noni & Londo 2010). Cemara beach is one of the important sites for migratory waders on the east coast of Jambi Province. The area has been known to host the endangered Nordmann's Greenshank *Tringa guttifer* (Noni & Philippa 2009) and is also a selected site for sampling for the avian influenza virus (HPAI) H5N1 in Indonesia (Noni & Londo 2008; Noni & Londo 2010). Together with the Banyuasin Peninsular, Cemara beach is a hotspot for waders during the non-breeding period in the East Asian-Australasian Flyway (Bamford *et al.* 2008). Although there have been many observations of waders on the east coast of Jambi Province, records during the northerly migration period, when waders start return to their breeding areas, are still lacking.

A survey of waders was conducted at two sites on the east coast of Jambi Province on 1 March 2011. Species numbers and abundance relative to earlier studies are discussed.

METHODS

Study area

Two locations on the east coast of Jambi Province were visited on 1 March 2011 (Figure 1). They were Cemara (01°25'59.0"S; 104°27'16.9"E) and Air Hitam Laut (01°19'53.8"S; 104°27'17.4"E). Cemara beach is a wide sandy coastal beach lined with casuarina trees *Casuarina equisetifolia*, river and mangrove habitat. It is administratively located within Cemara Village. Air Hitam Laut is a village with a sandy beach with mangrove vegetation along the coast. Both of the villages are within Tanjung Jabung Timur District, Jambi Province, Sumatra (Figure 1).

Wader surveys

Waders were counted during low tide when they were present on the mudflats. The time point count technique was used to collect data (Bibby *et al.* 2000). Sites (locations) were determined as one plot, and each plot was divided into five subplots. In every subplot, 30 minutes were taken to identify and count the birds seen along the shore. Binoculars (8x42) were used for identification and counting.

Standard Asian Waterbird Census site description and waterbirds count forms (Li & Ounsted 2007) were used for the surveys. Sites description forms enabled data to be collected on types of wetlands, vegetation, uses of and threats to wetlands. Wader count forms provided a standard list of all waders, against which numbers could be tallied (the standard list included other waterbirds, e.g. Storks, Egrets, etc.).

RESULTS & DISCUSSION

A total of 4,144 waders was counted from 15 species (Table 1). Black-tailed Godwit was most abundant species (48.43% of the total count), followed by Bar-tailed Godwit (19.30%), Terek Sandpiper (6.86%), Lesser Sand Plover (6.75%), Eurasian Curlew (3.81%), Pacific Golden Plover (3.18%), Whimbrel (2.22%), Kentish Plover (1.15%), Greater Sand Plover (1.06%), Asian Dowitcher (0.96%), Common Redshank (0.24%), Common Sandpiper (0.19%), Far Eastern Curlew (0.14%), Common Greenshank (0.12%) and Marsh Sandpiper (0.04%). Only a few birds were in breeding plumage. Comparison of wader numbers on 1 March 2011 with the 1% population estimate for the East Asian-Australasian Flyway (EAAF) is given in Table 2.

The following annotated list provides details of waders recorded and comparisons to earlier records. The sequence and nomenclature of each species follow Sukmantoro *et al.* 2007 as a reference for Indonesian birdlist.

Pacific Golden Plover *Pluvialis fulva*

A total of 132 birds was recorded during this survey. This is a largest number of Pacific Golden Plover ever recorded in Jambi province. Records from previous surveys in Jambi were six during October-November 1984 and three during

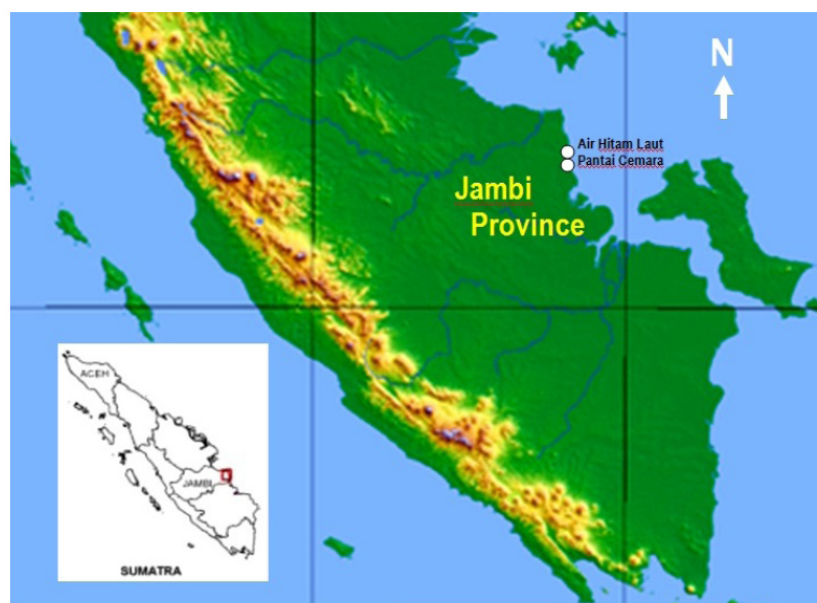


Figure 1. Circles indicate sites visited during the wader surveys on the east coast of Jambi province, Indonesia on 1 March 2011.

Table 1. Waders counted on the east coast of Jambi province on 1 March 2011. Number flagged refers to the count of birds with leg flags.

Species	Sites		Total	Number flagged		Total
	Cemara	Air Hitam Laut		Cemara	Air Hitam Laut	
Pacific Golden Plover	120	12	132	0	0	0
Kentish Plover	31	17	48	1	0	1
Lesser Sand Plover	250	30	280	10	1	11
Greater Sand Plover	4	40	44	0	3	3
Asian Dowitcher	40	0	40	0	0	0
Black-tailed Godwit	2,000	7	2,007	2	0	2
Bar-tailed Godwit	800	0	800	2	0	2
Whimbrel	80	12	92	0	0	0
Eurasian Curlew	150	8	158	0	0	0
Far Eastern Curlew	6	0	6	0	0	0
Common Redshank	10	0	10	0	0	0
Common Greenshank	0	5	5	0	0	0
Common Sandpiper	5	3	8	0	0	0
Marsh Sandpiper	2	0	2	0	0	0
Terek Sandpiper	200	82	282	5	3	8
Unidentified	200	30	230	0	0	0
TOTAL	3,898	246	4,144	10	7	27

March-April 1986 (Silvius 1988), one on 21 October 2007 and three on 9 December 2007 (Noni & Londo 2008).

Kentish Plover *Charadrius alexandrinus*

A total of 47 birds was recorded during this survey. This may be the largest number of Kentish Plover ever recorded in Jambi. Previous records in Jambi were one on 24 November in Berbak National Park 1984 (Silvius & Verheugt 1986), one during October-November 1984 and 14 birds during March-April 1986 (Silvius 1988, Danielsen & Skov 1989), three on 21 October 2007 and four on 9 December 2007 (Noni & Londo 2008). One bird was observed with a Sumatran flag (Table 1) and is one of three

birds flagged during 2007-2010 (Noni & Londo 2010). A bird of race of (White-faced) Kentish Plover *Charadrius alexandrinus dealbatus* was recorded (Figure 2). This is a second record for Cemara beach and possibly the third record for Sumatra (Bakewell & Kennerley 2008, Kennerley *et al.* 2008, Iqbal *et al.* 2010, Noni & Londo 2010).

Lesser Sand Plover *Charadrius mongolus*

A total of 280 birds was recorded during this survey. Previous records in Jambi were “thousands” on 24 November in Berbak National Park (Silvius & Verheugt 1986). In addition, 2,199 birds were recorded during October-November 1984, 10 birds during July-August 1985,

Table 2. Composition on waders numbers on the east coast of Jambi province on 1 March 2011 and comparison with 1% population estimate for the EAAF (following Bamford *et al.* 2008).

Species	Total	Percentage (of total count)	1% population in EAAF	Proportion of 1% population in EAAF
Pacific Golden Plover	132	3.18	1,000	0.132
Kentish Plover	48	1.15	1,000	0.048
Lesser Sand Plover	280	6.75	1,300	0.280
Greater Sand Plover	44	1.06	1,100	0.004
Asian Dowitcher	40	0.96	230	0.180
Black-tailed Godwit	2,007	48.43	1,600	1.250
Bar-tailed Godwit	800	19.30	3,250	0.240
Whimbrel	92	2.22	1,000	0.092
Eurasian Curlew	158	3.81	400	0.395
Far Eastern Curlew	6	0.14	380	0.015
Common Redshank	10	0.24	750	0.013
Common Greenshank	5	0.12	600	0.008
Common Sandpiper	8	0.19	250	0.032
Marsh Sandpiper	2	0.04	1,000	0.002
Terek Sandpiper	282	6.86	500	0.560
Unidentified	230	5.55	-	-
TOTAL	4,144	100%		



Figure 2. A male (White-faced) Kentish Plover *Charadrius alexandrinus dealbatus* at Cemara beach on 1 March 2011.

and 2,786 birds during March-April 1986 (Silvius 1988, Danielsen & Skov 1989), and 2,000 birds were recorded on 21 October 2007 and 560 on 9 December 2007 (Noni & Londo 2008). In the present study, 11 birds with Sumatran flags were observed, the highest number for any species during the survey. These 11 birds are part of 384 birds flagged during 2007-2010 (Noni & Londo 2010).

Greater Sand Plover *Charadrius leschenaultii*

A total of 44 birds were recorded in the east coast of Jambi province during this survey. Previous records in Jambi province were 35 birds during October-November 1984, seven birds during July-August 1985 and 215 birds during March-April 1986 (Silvius 1988, Danielsen & Skov 1989), 500 on 21 October 2007 and 200 on 9 December 2007 (Noni & Londo 2008). Three of 21 birds flagged in Sumatra during 2007-2010 (Noni & Londo 2010) were observed during the present study.

Asian Dowitcher *Limnodromus semipalmatus*

A total of 40 birds was recorded during this survey. Previous records in Jambi province were 97 birds in Berbak area on

24 November 1984 (Silvius & Verheught 1986), 1,460 birds during October-November 1984, 16 birds during July-August 1985 and 2,042 birds during March-April 1986 (Silvius 1988, Danielsen & Skov 1989), and 200 on 21 October 2007 and 100 on 9 December 2007 (Noni & Londo 2008).

Black-tailed Godwit *Limosa limosa*

A total of 2,007 birds was recorded during this survey (Figure 3). Previous records in Jambi were 8-16 birds on October 1983, up to 1,000 on 13 October and 1,500 on 16 October 1984 in Berbak National Park (Marle & Voous 1988), 7,477 birds during October-November 1984, 12,800 birds during July-August 1985 and 2,949 birds during March-April 1986 (Silvius 1988, Danielsen & Skov 1989), 2,000 on 21 October 2007 and 1,400 on 9 December 2007 (Noni & Londo 2008). The east coast of Jambi province is a significant stopover and wintering area for this declining species. Two birds were observed with Sumatran flags during this survey, which are part of six birds flagged during 2007-2010 (Noni & Londo 2010).



Figure 3. A mixed flock of Asian Dowitcher, Black-tailed Godwit, and other waders in flight at Cemara beach on 1 March 2011.

Bar-tailed Godwit *Limosa lapponica*

A total of 800 birds was recorded during this survey. Previous records in Jambi province included 1,209 birds during October–November 1984, 20 birds during July–August 1985 and 88 birds during March–April 1986 (Silvius 1988, Danielsen & Skov 1989), 1,500 on 21 October 2007 and 1,000 on 9 December 2007 (Noni & Londo 2008). A single bird was observed with Sumatra flags (Figure 4).

Eurasian Curlew *Numenius arquata*

A total of 158 birds was recorded during this survey. Previous records include a flock of 800 birds observed in Berbak National Park, Jambi province on 24 November 1984 (Silvius & Verheugt 1986), and 1,393 birds during October–November 1984, 2,253 birds during July–August 1985 and 114 birds during March–April 1986 (Silvius 1988, Danielsen & Skov 1989). The relatively small number recorded in the survey (which is comparable to numbers observed in the

same period in 1986) suggests that numbers are fewer during northward migration than during the northern hemisphere autumn and wintering period.

Far Eastern Curlew *Numenius madagascariensis*

A total of six birds was recorded during this survey. Previous records in Jambi province were 23 birds during October–November 1984 and 181 birds during March–April 1986 (Silvius 1988, Danielsen & Skov 1989), 100 birds on 21 October 2007 and 20 on 9 December 2007 (Noni & Londo 2008).

Whimbrel *Numenius phaeopus*

A total of 92 birds was recorded during this survey. Previous records in Jambi province were 700 birds during October–November 1984, 366 birds during July–August 1985 and 545 birds during March–April 1986 (Silvius 1988, Danielsen & Skov 1989), one on 23 October 2007 and 13 on 9 December



Figure 4. Four Bar-tailed Godwits *Limosa lapponica* resting at Cemara beach. The bird on the left has Sumatran flags, and the two birds in the centre are in fresh breeding plumage.

2007 (Noni & Londo 2008).

Common Redshank *Tringa totanus*

A total of 10 birds was recorded during this survey. Previous records in Jambi province were 6,222 birds during October–November 1984, 1,024 birds during July–August 1985 and 4,557 birds during March–April 1986 (Silvius 1988, Danielsen & Skov 1989), 58 on 21 October 2007 and three on 9 December 2007 (Noni & Londo 2008).

Common Greenshank *Tringa nebularia*

A total of five birds was recorded during this survey. Previous records in Jambi province were 38 birds during October–November 1984, one bird during July–August 1985 and 269 birds during March–April 1986 (Silvius 1988, Danielsen & Skov 1989), two on 21 October 2007 and four on 9 December 2007 (Noni & Londo 2008).

Common Sandpiper *Actitis hypoleucos*

A total of five birds was recorded during this survey. Previous records in Jambi province were 128 birds during October–November 1984, three birds during July–August 1985 and 12 birds during March–April 1986 (Silvius 1988, Danielsen & Skov 1989), six on 21 October 2007 and 17 on 9 December 2007 (Noni & Londo 2008).

Marsh Sandpiper *Tringa stagnatilis*

A total of two birds was recorded during this survey. Previous records in Jambi province were up to 15 during 9–16 October 1983 in Berbak National Park (Marle & Voous 1988), 301 birds during October–November 1984, 80 birds during July–August 1985 and 375 birds during March–April 1986 (Silvius 1988, Danielsen & Skov 1989), five on 21 October 2007 and 15 on 9 December 2007 (Noni & Londo 2008).

Terek Sandpiper *Xenus cinereus*

A total of 282 birds was recorded during this survey. Previous records in Jambi province were flocks of up to 100 birds on 14 October 1983 in Berbak National Park (Marle & Voous 1988), 2,331 birds during October–November 1984, 783 birds during July–August 1985 and 571 birds during March–April 1986 (Silvius 1988, Danielsen & Skov 1989), 125 on 21 October 2007 and 300 on 9 December 2007 (Noni

& Londo 2008). Eight birds were observed with Sumatran flags during this survey (one is pictured here: Figure 5), which are part of 108 birds flagged during 2007–2010 (Noni & Londo 2010).

DISCUSSION

A total of 4,144 waders was counted, comprising 15 species. Black-tailed Godwit was the most abundant species (48.43% of total count), followed by Bar-tailed Godwit (19.3%), Terek Sandpiper (6.86%) and Lesser Sand Plover (6.75%).

Black-tailed Godwit was the only species counted to reach more than 1% of the population estimate of waders in the EAAF. From previous records on the east coast of Jambi province, Black-tailed Godwit was the commonest wader. The largest number recorded was 12,800 birds during July–August 1985 (Silvius 1988, Danielsen & Skov 1989). There are three subspecies of the Black-tailed Godwit with *L. l. melanuroides* confined to the EAAF. This subspecies accounts for approximately 20% of the global population of the species. *L. l. melanuroides* breeds in eastern Siberia, and during the non-breeding period occurs in south-eastern Asia and Australia. Bamford *et al.* (2008) has been listed Air Hitam Laut (cited as Tanjung Jabung) as one important non-breeding area of Black-tailed Godwit in the EAAF. This recent finding confirms the importance of east coast of Jambi province as a non-breeding area for Black-tailed Godwit in EAAF.

A comparison of wader numbers made by Silvius (1988) on the east coast of Jambi province during the over-summering period (May–July), southward migration (August–October) and northward migration (March–April) showed that numbers occurring during northward migration are moderate compared to those recorded during southward migration and in the over-summering period. This is perhaps due to many birds taking a more direct route, passing east of Sumatra, from their wintering grounds to the breeding areas during the more urgent northward migration. During this survey, we found a number of birds of some species had already commenced or completed moult into breeding plumage (Figure 4).

Twenty-seven Sumatran-flagged waders was observed



Figure 5. A Terek Sandpiper *Xenus cinereus* with Sumatran leg flags (yellow above and black below).

during the survey, out of a total of 774 birds flagged overall between 2007 and 2010 (Noni & Londo 2010), which represents a re-sighting rate of 3.48%. Lesser Sand Plover (11 birds) and Terek Sandpiper (8 birds) were the most commonly sighted species with leg-flags. These are also two species most frequently flagged in Sumatra.

The number of waders counted at Cemara beach was far larger than at Air Hitam Laut. It is suspected that conditions at Cemara beach provide more food and suitable habitat for waders than Air Hitam Laut. Bordering with Berbak National Park, Cemara beach is a rich source of food for waders. This is possibly affected by peat swamp and mangrove forest in the adjacent area. Further surveys are needed to study wader numbers along the east coast of Jambi province, especially to better assess the populations of several threatened species such as Black-tailed Godwit, Asian Dowitcher and Nordmann's Greenshank.

Both Air Hitam Laut and Cemara beach are facing various threats. Main threats facing the areas, as identified by the IUCN and detailed in the Classification Scheme List of Threats (www.iucnredlist.org) are agriculture and aquaculture (by wood or pulp plantations and marine aquaculture) and biological resource use (logging or wood harvesting, and fishing or harvesting aquatic resources). The Cemara beach has been protected as buffer zone of Berbak National Park. Unfortunately, the Air Hitam Laut is still an unprotected area, and its small mangrove area should be protected by Indonesian law as Green Belt Zone. A Green Belt Zone is a border area containing natural vegetation, between the river and land ecosystems (riparian zone), that buffers the river from the landward impacts of human activities (Anon 2011). In the future, some conservation action such as further study and wader monitoring, providing wader identification training to local government staff and local people, and increasing awareness through education of local students should be supported in these areas.

ACKNOWLEDGEMENTS

The field work was part of internship programme on sharing knowledge between GIZ-MRPP (German International Cooperation-Merang REDD Pilot Project) and the ZSL-BCIP (Zoological Society of London-Berbak Carbon Initiative Project). We are very grateful to Dr. Karl Heinz Steinmann (GIZ-MRPP team leader), Laura Darcy and Dr. Agus Suratno (ZSL Indonesia Programme) and Ir. Fransisco Moga (the head of Berbak National Park) who made this survey possible. We would like to thank ZSL Berbak field team members, especially Ambo Unga, Zainal Abidin and Syaiful Edi for their assistance while the survey was carried

out. We would also like to thank an anonymous reviewer for providing comments on an earlier draft of this manuscript.

REFERENCES

- Anon. 2011. Peraturan Pemerintah Republik Indonesia Nomor 38 Tahun 2011 tentang Sungai [Government Regulation of the Republic of Indonesia Number 38 Year 2011 Concerning the River]. Government of Indonesia, Jakarta, Indonesia.
- Bakewell, D.N. & P.R. Kennerley. 2008. Field characteristics and distribution of an overlooked *Charadrius* plover from South-East Asia. *BirdingAsia* 9: 46-57.
- Bamford, M., D. Watkins, W. Bancroft, G. Tischler & J. Wahl. 2008. Migratory Shorebirds of the East Asian - Australasian Flyway: Population Estimates and Internationally Important Sites. Wetlands International-Oceania, Canberra, Australia.
- Bibby, C., M. Jones, & S. Marsden. 2000. Teknik-Teknik Ekspedisi Lapangan Survei Burung. BirdLife International Indonesia Programme, Bogor, Indonesia.
- Danielsen, F. & H. Skov. 1989. The importance of South-east Sumatra as a summering area for non-breeding waders, especially the Bar-tailed Godwit *Limosa lapponica*. *Stilt* 14: 40-42.
- Iqbal, M., H. Mulyono, R. Kadarisman & Surahman. 2010. A new southernmost record of White-faced Plover *Charadrius dealbatus*. *Wader Study Group Bulletin* 117(3): 190-191.
- Kennerley, P.R., D.N. Bakewell & P.D. Round. 2008. Rediscovery of a long-lost *Charadrius* plover from South-East Asia. *Forktail* 24: 63-79.
- Li, Z.W.D. & R. Ounsted. (Eds). 2007. The status of coastal waterbirds and wetlands in Southeast Asia: Results of waterbird survey in Malaysia (2004-2006) and Thailand and Myanmar (2006). Wetland International, Kuala Lumpur, Malaysia.
- Marle, J.G. Van. & K.H. Voous. 1988. The Birds of Sumatra: An Annotated Checklist. BOU Checklist No. 10. Tring, UK.
- Noni, F. & I. Londo. 2008. WCS GAINS (Global Avian Influenza network for surveillance) in Sumatra and Java. *Tattler* 9: 10-11.
- Noni, F. & I. Londo. 2010. Field report for Wildlife Conservation Society, Sumatra, Indonesia: December 2009-January 2010. *Tattler* 18: 8-10.
- Noni, F. & J. Phillipa. 2009. Nordmann's Greenshank *Tringa guttifer* on Cemara beach, Jambi, Indonesia. *BirdingAsia* 12: 97-99.
- Silvius, M.J. 1987. Notes on new wader records for Berbak Game Reserve, Sumatra. *Kukila* 3(1-2): 59-60.
- Silvius, M.J. 1988. On the importance of Sumatra's east coast for waterbirds with notes on the Asian Dowitcher *Limnodromus semipalmatus*. *Kukila* 3(3-4): 117-137.
- Silvius, M.J. & W.J.M. Verheugt. 1986. The birds of Berbak Game Reserve, Jambi province, Sumatra. *Kukila* 2(4): 76-84.
- Sukmantoro, W., M. Irham, W. Novarino, F. Hasudungan, N. Kemp & M. Muchtar. 2007. Daftar Burung Indonesia No. 2. The Indonesian Ornithologist's Union/LIPI/OBC Smythies Fund/Gibbon Foundation, Bogor.

LAMPIRAN 4

Technical Report

Mammalian Biodiversity Survey in Berbak National Park

Citra Novelina and Erwin A Perbatakusuma

1. Status of Sumatran Tiger

During ZSL camera trap surveys conducted between 2007 and 2011 a total of 14 individual tigers were identified in Berbak National Park: 6 females, 6 males and 2 of unknown sex. However, 2 individual tigers were found dead in 2011, both of which were identified as tigers which had been among the 14 individuals that had been recorded by ZSL camera traps. Both of them were male tigers. One has been positively identified as *King Arthur* (a male tiger that was first photographed in June 2010). The other one could not be identified because the skin and other parts of its body had been taken by local villagers. Therefore, we had a total of 12 Berbak tigers until we captured 1 new male tiger in February 2011, increasing the total to 13 individuals.

On February 15th 2012, we (ZSL, Berbak and CIFOR staff, and porters) were shocked when tiger bones were found at Simpang Gajah in Berbak National Park. The tiger had been killed by a snare. From the evidence, we estimated that the tiger had been killed 1 month before the bones were found. The tiger had become caught up in the snare and we found that some of its bones were still tied up in the snare. With this tragic evidence, the total number of recorded Berbak tigers decreased again to 12 individuals.

Sample Berbak Tiger Pictures

Male Tigers

Name: **Pandawa**

- Estimated age: 8 – 10 years old
- Locations captured on camera trap: Parit 16, Parit 14, Sungai Jering, Simpang Piatu, Simpang Gajah, Simpang Kubu



Picture 1. Right side of Pandawa



Picture 2. Left side of Pandawa

Name: **Jamantara**

- Estimated age: 7 – 8 years old
- Locations captured on camera trap: Parit 14, Simpang Malaka, Simpang Kubu, Simpang Gajah



Picture 3. Right side of Jamantara



Picture 4. Left side of Jamantara

Female Tigers

Name: **Mahadewi**

- Estimated age: 6 – 7 years old
- Locations captured on camera trap: Parit 14, Simpang Malaka, Sungai Jering



Picture 5. Right side of Mahadewi



Picture 6. Left side of Mahadewi

Name: **Isabela**

- Estimated age: 6 -7 years old
- Locations captured on camera trap: Parit 14, Simpang Malaka



Picture 7. Right side of Isabela



Picture 8. Left side of Isabela

Sample Berbak Tiger Prey Pictures

a) Wild Pig (*Sus scrofa*)



Picture 9. Wild pig (*Sus scrofa*)



Picture 10. Wild pig (*Sus scrofa*)

b) Sambar Deer (*Cervus unicolor*)



Picture 11. Sambar deer (*Cervus unicolor*)



Picture 12. Sambar deer (*Cervus unicolor*)

c) Greater Mouse Deer (*Tragulus napu*)



Picture 13. Greater mouse deer (*Tragulus napu*)

2. Berbak Tiger Distribution by Forest Type

1. Tiger distribution in Berbak National Park primary peat swamp forest.

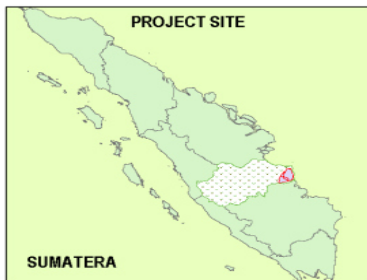
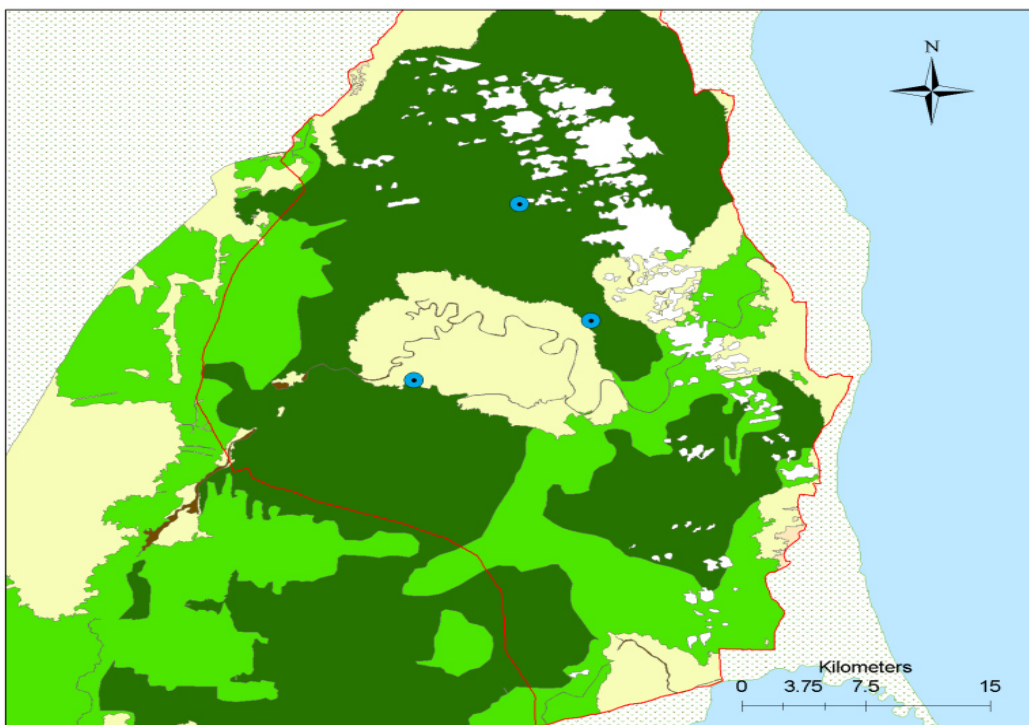
Surveys from 2007 – 2011 showed that there were 3 locations of tiger distribution in the primary forest. The table and map below illustrate the distribution.

Table 1. Tiger Distribution in Berbak NP Primary Peat Swamp Forest.

Location	GPS_X	GPS_Y	Total individual of tiger	Sex	Age estimation (years)	Name / ID
Simpang gajah	042271 7	984590 6	1	Male	7 - 8	<i>Jamantara</i>
Lubuk bundar	041838 8	985467 5	1	Male	8 - 10	<i>Julio</i>
Simpang raket	041202 6	984144 0	1	Female	6 - 7	<i>Susan</i>



**TIGER DISTRIBUTION MAP IN PRIMARY FOREST
BERBAK NATIONAL PARK**



Legend

- Tigers_in_Berbak_primary_forest
- TN_BERBAK
- BCI_Landcover2007
- <all other values>
- LANDCOV_EN
- Agriculture, mixed with shrub
- Cloud
- Primary swamp forest
- Secondary swamp forest
- Swamp bush
- Water body
- BCI_Jambi_prov

Prepared by : Citra Novalina P, S.Hut
 Date : 26 Februari 2012
 Field Survey Coordinator
 ZSL-IP
 Berbak Carbon Initiative Project

Coordinate System : WGS 1984 UTM Zone 48S

MAP 1. Tiger distribution in Berbak National Park Peat Swamp Primary Forest

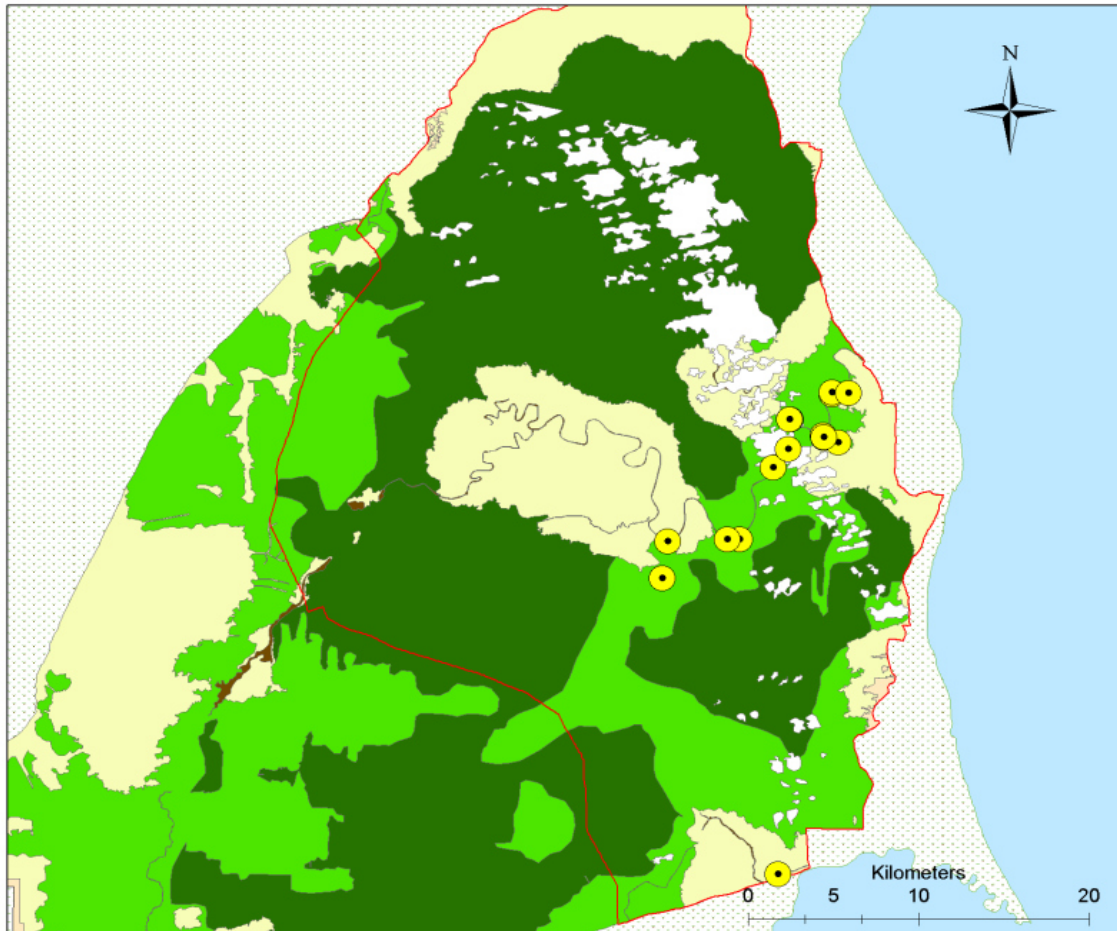
2. Tiger distribution in Berbak National Park Secondary Peat Swamp forest.

Surveys from 2007 – 2011 showed that there were 10 locations of tiger distribution in the secondary peat swamp forest. The table and map below illustrate the distribution.

Table 2. Tiger Distribution in Secondary Peat Swamp Forest.

Location	GPS_X	GPS_Y	Total individual of tiger	Sex	Age estimation (years / average)	Name / ID
Simpang Kubu	0422307	983884 6	6	3 male, 3 female	4 - 10	<i>Pandawa, Satria, Susan, Kartini, Jamantara, unknown female</i>
Parit 14	0431968	984782 7	5	3 male, 2 female	4 - 10	<i>Jamantara, Mahadewi, Isabela, King Arthur, Pandawa</i>
Parit 14 hilir	0431942	984795 9	1	Male	7 - 8	<i>Jamantara</i>
Simpang Gajah kiri	0426507	983897 9	4	2 male, 2 female	6 - 10	<i>Satria, Pandawa, Kartini, Susan</i>
Simpang Gajah	0425792	983896 9	1	Female	6 - 7	<i>Susan</i>
Simpang Gajah	0425782	983896 5	1	Male	8 - 10	<i>Pandawa</i>
Simpang Piatu kiri	0428512	984334 9	5	3 male, 2 female	4 - 10	<i>Pandawa, Satria, Susan, Lestari, Raja Belang</i>
Simpang	0429368	984449	1	Male	7 - 8	<i>Jamantara</i>

Piatu kanan		1				
Simpang Malaka	0429483	984631 5	3	1 male, 2 female	6 - 8	<i>Jamantara, Isabela, Mahadewi</i>
Simpang Malaka	0429471	984631 5	1	Male	7 - 8	<i>Jamantara</i>
Sungai Simpang Kubu	0421968	983660 2	1	Male	8 - 10	<i>Pandawa</i>
Sungai Jering	0431455	984516 2	2	Unknown sex	3 & 6	<i>2 unknown tigers</i>
Sungai Jering	0431444	984532 5	1	Male	8 - 10	<i>Pandawa</i>
Sungai Jering	0432320	984488 0	1	Male	8 - 10	<i>Pandawa</i>
Sungai Jering	0431454	984522 6	1	Male	8 - 10	<i>Pandawa</i>
Parit 16	432910	984792 9	1	Male	8 - 10	<i>Pandawa</i>
Sungai Benu	428756	981851 8	1	Male	8 - 10	<i>unknown male</i>



Legend	
	Tigers_in_Berbak_secondary_forest
	TN_BERBAK
	BCI_Landcover2007
	<all other values>
	LANDCOV_EN
	Agriculture, mixed with shrub
	Cloud
	Primary swamp forest
	Secondary swamp forest
	Swamp bush
	Water body
	BCI_Jambi_prov

Prepared by : Citra Novalina P, S.Hut
 Date : 26 Februari 2012
 Field Survey Coordinator
 ZSL-IP
 Berbak Carbon Initiative Project

Coordinate System : WGS 1984 UTM Zone 48S

MAP 2. Tiger distribution map in Berbak National Park secondary forest

3. Berbak Tiger Density

From camera trap survey results for the time period 2007 – 2011, it was calculated that tiger density in Berbak National Park was 3 individual tigers per 100 km². This number was calculated using SPACECAP Software. To run this software and generate results, we input data such as survey area size, total number of individual tigers, and the capture frequency of each tiger at every camera station.

4. Habitat Use by Berbak Tigers

Camera trap survey results indicated that the preferred habitat of Berbak tigers is secondary peat swamp forest. Between 2007 and 2011, we set cameras mostly in secondary forest which is located near to the river. The cameras showed excellent results with many tiger pictures and videos recorded. Based on these data, we were able to calculate the tiger population. Camera traps in Berbak primary peat swamp forest produced fewer tiger pictures and videos. However, we cannot conclude from this that Berbak tigers do not like primary forest as results were biased because most camera traps were located in secondary forest.

The main prey species for Berbak tigers are wild pig (*Sus scrofa*) and Sambar deer (*Cervus unicolor*). Other prey could include small mammals such as macaques.

Another factor in the tigers' apparent preference for secondary forest might be because it is located near the river, the largest water source in Berbak forest. The tiger (*Panthera tigris*) is one of the two species of big cats who love water, the other being the jaguar (*Panthera onca*). Both are known to swim across rivers and to use water to soak their bodies.



Picture 14. Tiger footprint in ex-burned area

In the ex-burned area and swamp bush, no tiger pictures or videos were recorded. However, during biodiversity surveys in these habitats, the ZSL team found tiger signs such as tiger footprints and, in Sungai Benu Resort, a southern area of the park consisting of an extensive area of swamp bush, the team found tiger footprints near the river and also in the vicinity of deer footprints.

5. Mammals Captured by Camera Trap in Berbak National Park

Between 2007 and 2011, a total of 27 mammalian species were captured by camera trap, all of which have IUCN Red List Status. 1 species, the Sumatran tiger (*Panthera tigris sumatrae*), is critically endangered; 4 species are endangered, including the Malayan tapir (*Tapirus indicus*) and flat-headed cat (*Prionailurus planiceps*); 8 species are vulnerable including the bearded pig (*Sus barbatus*), Sumbar deer (*Cervus unicolor*), Malayan sun bear (*Helarctos malayanus*), and banded palm civet (*Hemigalus derbyanus*); and 14 species are listed as less concern, such as greater mouse deer (*Tragulus napu*), lesser mouse deer (*Tragulus javanicus*) and wild pig (*Sus scrofa*).

Among the mammalian species found in this study, 14 are protected by Indonesia Government Regulation No. 7 Year 1999 concerning Flora and Fauna Species Conservation. These include *Panthera tigris sumatrae*, *Tapirus indicus*, *Tragulus napu*, *Tragulus javanicus*, *Cervus unicolor*, *Prionailurus bengalensis*, *Prionailurus planiceps* and *Neofelis diardi*.

In addition, all mammalian species recorded in Berbak are listed on CITES, including 6 species categorised as Appendix 1, 8 species included on Appendix 2 and 4 species categorised as Appendix 3. See Table 3 below for more detail.

Table 3. Conservation Status of Mammalian Species Recorded in Berbak NP

No	Local Name	English Name	Scientific Name	Species Conservation Status		
				IUCN	CITES	PROTECTED BY INDONESIA GOVERNMENT REGULATION No.7/ 1999
1	Harimau sumatera	Sumatran tiger	<i>Panthera tigris sumatrae</i>	Critically endangered	Appendix I	P
2	Tapir	Malayan tapir	<i>Tapirus indicus</i>	Endangered	Appendix I	P
3	Napu	Greater mousedeer	<i>Tragulus napu</i>	Least concern	-	P
4	Kancil	Lesser mousedeer	<i>Tragulus javanicus</i>	Least concern	-	P

No	Local Name	English Name	Scientific Name	Species Conservation Status		
				IUCN	CITES	PROTECTED BY INDONESIA GOVERNMENT REGULATION No.7/ 1999
5	Babi hutan	Wild pig	<i>Sus scrofa</i>	Least concern	-	-
6	Babi berjenggot	Bearded pig	<i>Sus barbatus</i>	Vulnerable	-	-
7	Rusa sambar	Sambar deer	<i>Cervus unicolor</i>	Vulnerable	Appendix I	P
8	Kucing hutan	Leopard cat	<i>Prionailurus bengalensis</i>	Least concern	Appendix II	P
9	Kucing tandang	Flat-headed cat	<i>Prionailurus planiceps</i>	Endangered	Appendix I	P
10	Macan dahan	Clouded leopard	<i>Neofelis diardi</i>	Vulnerable	Appendix I	P
11	Beruk	Pig-tailed macaque	<i>Macaca nemestrina</i>	Vulnerable	Appendix II	-
12	Monyet ekor panjang	Long-tailed macaque	<i>Macaca fascicularis</i>	Least concern	Appendix II	-
13	Lutung simpai	Sumatran surili	<i>Presbytis melalophos</i>	Endangered	Appendix II	-
14	Lutung simpai merah bata	Red-leaf monkey	<i>Presbytis rubicunda</i>	Least concern	Appendix II	P
15	Beruang madu	Malayan sun bear	<i>Helarctos malayanus</i>	Vulnerable	Appendix I	P
17	Musang belang	Banded palm civet	<i>Hemigalus derbyanus</i>	Vulnerable	Appendix II	-
18	Musang leher kuning	Yellow-throated marten	<i>Martes flavigula</i>	Least concern	Appendix III	-
19	Linsang	Banded linsang	<i>Prionodon linsang</i>	Least concern	Appendix II	P
20	Musang luwak	Common palm civet	<i>Paradoxurus hermaphroditus</i>	Least concern	Appendix III	P
21	Binturong	Binturong	<i>Arctictis</i>	Vulnerable	Appendix	P

No	Local Name	English Name	Scientific Name	Species Conservation Status		
				IUCN	CITES	PROTECTED BY INDONESIA GOVERNMENT REGULATION No.7/ 1999
	sumatera		<i>binturong</i>		III	
22	Tupai tanah	Large treeshrew	<i>Tupaia tana</i>	Least concern	-	-
23	Musang ekor pendek	Short-tailed mongoose	<i>Herpestes brachyurus</i>	Least concern	-	-
24	Musang air	Otter civet	<i>Cynogale bennettii</i>	Endangered	Appendix II	P
25	Angkis ekor panjang	Long-tailed porcupine	<i>Trichys fasciculata</i>	Least concern	-	-
26	Bajing ekor pendek	Low's squirrel	<i>Sundasciurus lowii</i>	Least concern	-	-
27	Tikus pohon kelabu	Sundaic lenothrix	<i>Lenothrix canus</i>	Least concern	-	-

KEY:

IUCN (International Union for Conservation of Nature) RED LIST OF THREATENED SPECIES:

LC: Less Concern, NT: Near Threatened, VU: Vulnerable, CR: Critically Endangered, EN: Endangered, EW: Extinct in the Wild, EX: Extinct, DD: Data Deficient.

CITES (Convention on International Trade in Endangered Species of Wild Fauna and Flora):

Appendix I lists species that are the most endangered among CITES-listed animals and plants (see Article II, paragraph 1 of the Convention). They are threatened with extinction and CITES prohibits international trade in specimens of these species except when the purpose of the import is not commercial (see Article III), for instance for scientific research. In these exceptional cases, trade may take place provided it is authorized by the granting of both an import permit and an export permit (or re-export certificate). Article VII of the Convention provides for a number of exemptions to this general prohibition.

Appendix II lists species that are not necessarily now threatened with extinction but that may become so unless trade is closely controlled. It also includes so-called "look-alike species", i.e. species of which the specimens in trade look like those of species listed for conservation

reasons (see *Article II, paragraph 2* of the Convention). International trade in specimens of Appendix-II species may be authorized by the granting of an export permit or re-export certificate. No import permit is necessary for these species under CITES (although a permit is needed in some countries that have taken stricter measures than CITES requires). Permits or certificates should only be granted if the relevant authorities are satisfied that certain conditions are met, above all that trade will not be detrimental to the survival of the species in the wild. (See *Article IV* of the Convention)

Appendix III is a list of species included at the request of a Party that already regulates trade in the species and that needs the cooperation of other countries to prevent unsustainable or illegal exploitation (see *Article II, paragraph 3*, of the Convention). International trade in specimens of species listed in this Appendix is allowed only on presentation of the appropriate permits or certificates. (See *Article V* of the Convention)

P: Protected by Indonesia Law (Government Regulation No. 7 / 1999)

6. Habitat Use by Large Mammals in Berbak NP

Some of the wild animals classified as large mammals in Berbak include :

Sambar deer (*Cervus unicolor*).



Picture 15. Sambar deer (*Cervus unicolor*)

The population of this deer species is thought to be low in Berbak NP. According to survey results and information gathered from local people, this animal prefers to live in open areas such as ex-burned and in secondary forest near a water source.

Malayan Tapir (*Tapirus indicus*)



Picture 16. Tapir (*Tapirus indicus*)

The tapir is one of the most often recorded species (pictures and signs) in primary and secondary forest, agricultural land, and in/near settlements. In Berbak NP, tapirs prefer to live in secondary forest. Tapir traces are very often found near tiger trails.

Wild pig (*Sus scrofa*)



Picture 17. Wild pig (*Sus scrofa*)

*The main tiger prey in Berbak NP is the wild pig (*Sus scrofa*). The distribution of wild pig in Berbak ranges from primary and secondary forest to open areas and swamp bush. However, this animal is predominantly found in the secondary forest of Berbak NP.*

Malayan sun bear (*Helarctos malayanus*)



Picture 18. Malayan sun bear (*Helarctos malayanus*)

During ZSL surveys, signs of this bear were never found in open areas or swamp bush, but were predominantly recorded in primary and secondary forest.

Clouded leopard (*Neofelis diardi*)



Picture 19. Clouded leopard (*Neofelis diardi*)

This picture of clouded leopard is a still taken from a 10 second video of a clouded leopard in Berbak secondary forest. The habitat is degraded due to illegal logging activity inside the park at Air Hitam Dalam. This video was the first time ZSL recorded the clouded leopard in Berbak NP.

Leopard cat (*Prionailurus bengalensis*)



Picture 20. Leopard cat (*Prionailurus bengalensis*)

The picture is of a leopard cat that was captured in 2010 in Berbak primary forest. In 2009, ZSL camera traps also recorded this native felid in Berbak secondary forest. No signs of this cat (which is IUCN Red Listed as Least Concern) were found in open areas or swamp bush habitat in Berbak.

Flat-headed cat (*Prionailurus planiceps*)



This animal is one the most rarely seen cats, both in pictures and from signs. The picture above is a still from a 10 second video of a flat-headed cat which was recorded by a ZSL camera trap located in Berbak primary forest. It is the first time ZSL recorded a flat-headed cat.

Picture 21. Flat-headed cat (*Prionailurus planiceps*)

Pig-tailed macaque (*Macaca nemestrina*)



The pig-tailed macaque is one of the most easily found primates, both in camera trap photos and videos and from signs. They occur in all land cover types throughout the Berbak ecosystem. Based on ZSL camera trap results, this primate is predominantly seen in Berbak secondary forest.

Picture 22. Pig-tailed macaque (*Macaca nemestrina*)

Yellow-throated marten (*Martes flavigula*)



The yellow-throated marten was first captured by ZSL camera trap in 2009 in Berbak primary forest, at Simpang Gajah. Then, in 2010, a ZSL camera trap captured this mongoose in primary forest at Lubuk Bundar.

Malay civet cat (*Arctictis binturong*)



Picture 27. Malay civet cat (*Arctictis binturong*)

*Malay civet cat (*Arctictis binturong*) can be found in primary and secondary forest. However, in Berba National Park, this animal is rarely found, even in the secondary forest. This might be because Bintorong are known to be primarily arboreal.*

ZSL survey results showed that the ideal camera trap height to capture binturong is 25 – 35 cm above the ground. The above photograph is the only record of the binturong collected by the ZSL Indonesia Programme to date.

Lampiran 5

A Baseline Survey of Gibbons at Berbak National Park

**Murray Collins, Erwin A Perbatakusuma, Mulya Shakti, Citra Novelina,
Rachman Dedi and Waluyo Sugito**

Abstract

We explore the use of auditory survey techniques for vocalising arboreal primates in the context of biodiversity monitoring at the ZSL Berbak Carbon Initiative in Sumatra's Jambi province. Historically tropical peat swamp forest (PSF) received less research attention than tropical forests on drier mineral soils. Yet in the context of the strong focus of Indonesia's REDD+ programme upon carbon rich peatland, and from the perspective of biodiversity conservation, the urgency to answer questions over the biological value of unsurveyed, but carbon-rich peatlands has never been greater.

Our goals were 1. to provide the first population density estimate for Gibbons (*Hylobates agilis*) for this pilot REDD+ site, and 2. to inform the development of research techniques for biodiversity monitoring in peat swamp forests more generally. Since our focal species is renowned for its vocalisation, we employed an auditory survey technique. We used triangulation surveys at four sites at Berbak. At each site three pairs of observers, separated by at least 300m, recorded the bearing and estimated distance of gibbon vocalisations. We performed a total of 5 surveys, each taking between 3 and 4 days. The results of one of the surveys had to be discounted, after difficult field conditions led to sub-optimal placement of field observers. Of the four remaining sites, we estimated the mean gibbon group density to be between 1.1 and 2.3 groups per km².

2. Methods

Various methods exist to determine population statistics for forest biodiversity, but for vocal arboreal primates, auditory detection methods are favoured amongst researchers (Brockelman and Ali, 1987). Some researchers have used single point counts from the top of mountain ridges in order to determine angle and distance of gibbon groups (Nijman and Menken, 2005). However, Cheyne et al. (2007) suggested that at least three listening posts should be used in any survey in order to both increase the sampling area and probability of detecting any groups present in the area.

Deploying field teams is expensive for conservation NGOs, particularly to remote and difficult-to-access locations. Whilst surveys longer than the present study have been published in the literature, Buckley et al. (2006) found that the 3-day sample periods are sufficient to make

density estimates. As such our minimum listening survey was 3 days, although one survey at Sungai Sawa lasted for four days, and one day's data had to be discounted from survey 4.

At each site, the field team was in each listening post to start listening for calls at 04.00, and listened through until 09.00, or until gibbons stopped calling. The bearing and estimated distance to each of the gibbon groups was recorded by observers along with the prevailing weather condition. At each listening post each observer recorded their own data and then double checked this with the record of their colleague.

One significant challenge at this site is the overlap between the hours required to start recording gibbon calls, and the hunting preferences of the sumatran tiger (*Panthera tigris sumatrae*). Berbak is a site of global importance for tiger conservation (REF), yet has been the site of intense human-tiger conflict recently. This presents a double-edged sword in that the conflict itself is a key reason for ZSL to be active at BCI, but can simultaneously present hazardous conditions for field researchers. As such a compromise was reached whereby field teams established listening points at or near to the forest edge, to avoid walking through tiger habitat during the period when they are highly active. This was thought to be an acceptable position on the tradeoff between field safety and sampling area. Moreover, in the analysis we were able to account for the potential bias by reducing the effective listening area to account for the fact that a proportion of the area was outside gibbon habitat. However this cannot account for the inability to sample in more in-tact primary forest.

3. Analysis

In order to determine the number of Gibbon groups at the site, we plotted the estimated position of each gibbon group from each listening point using bespoke scripts in conjunction with the *Raster* and *Calibrate* packages within the R programming environment (R Development Core Team, 2012; Figure 1.). We considered the plotted positions along with the time at which they were recorded at each listening point in order to account for any groups moving during the listening period. Following Brockelman and Ali (1987) any estimated gibbon locations mapped more than 500 m apart were considered to be from different groups. We only included groups that were identified by two or more of the listening posts.

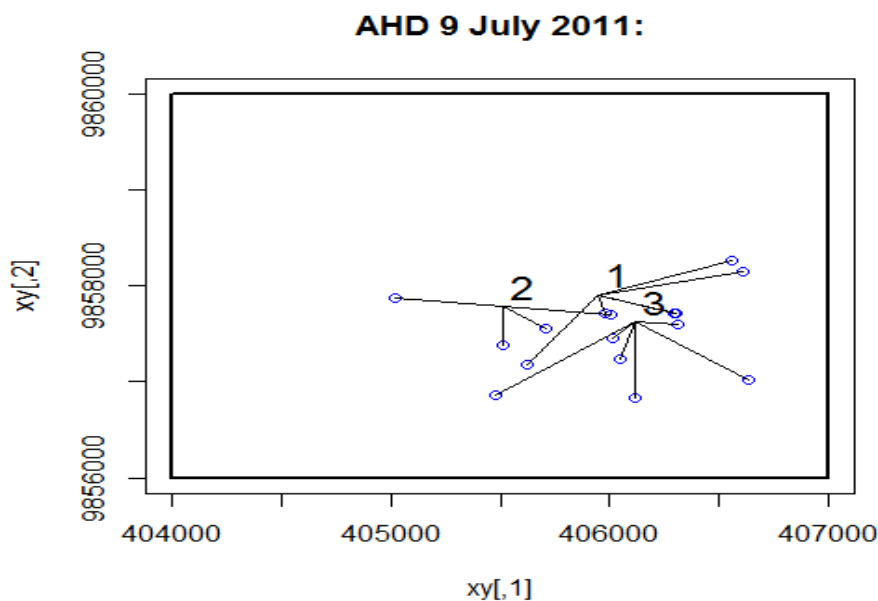
We calculated density estimates of gibbons by using $D=n/E$ (Brockelman and Srikosamatarata 1993). The size of the sampling area was calculated based upon the assumption that gibbons can be heard up to 1km away in the forest at Berbak. We calculated the area of land with no potential habitat (treeless swamp bush) using the area tool in ArcGIS and deducted this from the original estimate of the listening area. As a base layer we used a landcover classification map created from a 2008 SPOT image (Satellite Pour L'Observation de la Terre).

3. Results and Discussion

Gibbon groups called frequently and for long durations, with calls being recorded constantly from individual groups for period of over 2.5 hours. The group density across the four sites varied from 1.1 to 2.3 groups/km², mean=1.7km². The listening area for the survey sites ranged from 1.2km² to 2.7km². These results are summarised in table 1.

Our density estimates are lower than the 2.1-2.9 groups km² recorded for instance by Nijman and Menken (2005); or the 2.59km² from Sebangau, Kalimantan by Cheyne et al. (2008). At each of our sites, calls identified by one listening point only were excluded from the analysis. This may have placed a downward bias on the estimate of gibbon density for BCI. However this is a standard technique to allow our results to be comparable with those of other triangulation studies. We must therefore assume that there is a similar downward bias on the results of all similar gibbon studies. In questioning this low density estimate, it should be noted crucially that these surveys were conducted in edge habitat, which included swamp bush and secondary forest in addition to primary peat swamp forest. As such density here may expected to be lower than in the in-tact interior of the park. We aim to test this hypothesis after the resolution of this intense period of human-tiger conflict.

Figure 1.



With four data points it is not possible to make assertions about the relationship between habitat type and gibbon density. However ongoing work at the site should both verify the initial baseline estimates we have made, and enable some more analyses of the relationships between habitat type, carbon density and gibbon density.

Table 1. Gibbon Survey Analysis

#	Site Name	Coordinate of LP1 UTM 48S	Dates of survey	Notes	Mean estimated number of groups	Listening area km ²	Estimated density. Groups/k m ²
1	Air Hitam Dalam A	0405951 - 9857913	20-22 March 2011 (3 days, one day discounted)	Secondary forest	3	2	1.5
2	Air Hitam Dalam B	0405947 - 9857910	6-9 July 2011 (3 days)	Secondary forest, adjacent to primary	3	2.7	1.1
3	Sungai Sawah	0409155 - 9862372	9-12 September 2011 (3 days)	Edge of primary forest	3	1.6	1.9
4	Simpang Kayu Aro	0406545 - 9858502	13-16 September 2011 (4 days)	Mosaic: edge of primary forest, swamp bush, secondary	2.75	1.2	2.3
5	<i>Air Hitam Dalam</i>	<i>0409569 - 9862328</i>	<i>11-13 April 2011</i>				<i>Data Discounted</i>
						Mean	1.7

References

Brockelman WY, Srikosamatara S (1993) Estimation of density of gibbon groups by use of loud songs. *Am J Primatol* 29(2):93–108

Buckley, C. & K. A. I. Nekaris & Simon John Husson (2006) Survey of *Hylobates agilis albibarbis* in a logged peat-swamp forest: Sabangau catchment, Central Kalimantan. *Primates* (2006) 47: 327–335

Brockelman, W.Y. & R. Ali, (1987). Methods of surveying and sampling forest primate populations. In: C.W.Marsh & R.A. Mittermeier (eds) *Primate conservation in the tropical rainforest*. Alan Liss, New York. pp. 23-62.

Brockelman WY, Srikosamatara S (1984) Maintenance and evolution of social structure in gibbons. In: Preuschoft H, Chivers DJ, Brockelman WY, Creel N (eds) *The lesser apes: evolutionary and behavioural biology*. Edinburgh University Press, Edinburgh, pp 298–323.

Cheyne, S.M. & Claire J. H. Thompson & Abigail C. Phillips & Robyn M. C. Hill (2007) Density and population estimate of gibbons (*Hylobates albibarbis*) in the Sabangau catchment, Central Kalimantan, Indonesia. Suwido H. Limin

Nijman, V. and Menken, S.B. (2005) Assessment of census techniques for estimating density and biomass of gibbons (*Primates: Hylobatidae*). *The Raffles Bulletin of Zoology* 53(1):169-179.

R Development Core Team (2012). R: A language and environment for statistical computing. R Foundation for Statistical Computing, Vienna, Austria. ISBN 3-900051-07-0, URL <http://www.R-project.org/>.


ZSL
LIVING CONSERVATION

Conservation Programmes

UPKKL

**Environmental Conflict and Crime Unit
of Berbak Ecosystem**

*'Unit Penanggulangan Konflik dan Kejahatan Lingkungan Wilayah
Ekosistem Berbak'*



Final report to 21st Century Tiger
Zoological Society of London, Indonesia Programme
(Laura D'Arcy with Pak Nurazman, Dolly Priatna and Agus Suratno)

Executive Summary

It is clear that if threats to the tiger population in and around Berbak National Park such as poaching and conflict are not addressed immediately, then long term plans to protect and conserve the national park through REDD financing could potentially be for a forest empty of tigers. As a result of joint funding received from 21st Century Tiger and the USFWS, ZSL – working closely with Berbak National Park (Taman Nasional Berbak), the Nature Conservation Agency (Balai Konservasi Sumber Daya Alam (BKSDA)) and the Forestry Department of Jambi (Dinas Kehutanan Muaro Jambi) forest police– has established a wildlife crime unit to counter these threats.

The “Unit Penanggulangan Konflik dan Kejahatan Lingkungan” (UPKKL) wildlife crime unit was modelled on the highly successful Kerinci Seblat Sumatran Tiger Protection and Conservation Team (PHSKS), to deal with tiger poaching, illegal wildlife trading and crime, and human-wildlife conflict. The team is staffed with ranger police from the three key government agencies, who are seconded to the unit on a part time basis with postings staggered, allowing the unit to be continually staffed. The focus of the unit in the first year was to have a tangible and effective presence in the area, meeting the needs of the communities through socialisation events and human-wildlife conflict mitigation and those of the tiger population through anti-poaching patrols and crime detection.

To achieve this, the team underwent basic training in Kerinci National Park with the PHSKS. The training focused on crime detection and investigation and conflict mitigation protocols and models adopted by PHSKS. To date the UPKKL has established successful standard operating procedures for; rapid and effective responses to any wildlife crime or human-wildlife conflict; crime investigations; reporting and follow-up; ongoing community socialisation; and practical proactive field patrols and operations.

The unit has formed good links with communities, established by dealing with human-wildlife conflicts as and when they have occurred and by working closely with communities that have been affected in the past. There is a 24-hour hotline on which communities can call the unit if such incidents occur, and 12 community rangers have been selected and trained to provide continuous on the ground support for their communities, communities which have been affected the most frequently by conflicts. It is hoped that in the future these links will be reinforced so that they provide an informal, yet effective network of communication to prevent wildlife crime or at the very least act as a deterrent to potential poachers or illegal traders. Since the inception of the unit there has only been one tiger-related death in the unit’s area of operation, which occurred in March only a month after the unit was created.

UPKKL activities

Conflict activities

During the course of the year wildlife conflict issues were addressed both in the field and through community and stakeholder participatory events. These included meetings and consultations involving relevant institutions and law enforcement agencies as well as socialisations, workshops and a poster campaign in local communities. These activities have enabled the UPKKL team to establish an informal network for reporting wildlife crime and human-wildlife conflicts. A more formal network was put in place in areas known to have a high frequency of wildlife conflicts. The network to date includes 12 resident village rangers (community rangers) who have taken it in turns to join the team and participate in patrolling operations. One undercover informant has also been recruited by the team, with a view to obtaining sensitive information on wildlife poaching and illegal trafficking.

One of the first conflicts the team dealt with was in March 2010, when a man from the Sungai Aur village was attacked by a tiger in TN Berbak. He was attacked at 11pm while staying overnight in the forest with three other individuals, all engaged in collecting wood. The victim received wounds to his leg and neck but was saved from further injury when the tiger was scared off by his friends. He was interviewed in hospital by the team and the site of the attack was visited and patrolled by the unit, however the tiger did not return. A detailed report was submitted to the BKSDA chief and Head of TN Berbak.

A second, and fatal, incident occurred in late in March in a remote fishing hut. Earlier in the month the village of Seponjen had reported tiger attacks on village cattle, the latest in a series of attacks on the community's livestock. The Unit was deployed and decided, after a review of recent sustained conflicts in the area, to try to capture the tiger for translocation. Over the course of five days the unit worked with the village chief and other community members to try and trap the tiger, but although it was heard once by a member of the team the trapping was unsuccessful. The village was then trained in how to build and use scaring devices to prevent further attacks and villagers were advised to contact the team in the event of any tiger sightings. Two weeks later the team were called out by the villagers to investigate the death of a 25 year old fisherman who had been killed by a tiger 2 hours up stream. The team responded immediately and investigated the incident, again following up with the community to reduce the possibilities of reprisal attacks any tigers that may enter the vicinity of the village

The below image was from such a demonstration event in Rantau Rasau village where 28 goats and two cows had been eaten. A box trap was also placed near the area where cattle were kept in case the tiger did return, with the aim of translocating the tiger if caught.



Over the course of the grant period the team were called out to 12 separate direct human-wildlife conflicts.

No.	Village	REGENCY	WILD ANIMAL CONFLICT
1	Teluk rendah	Tebo	Sumatran Tiger
2	Muara Imat	Kerinci	Sumatran Tiger
3	Sungai Gelam	Muara Jambi	Sumatran Tiger
4	Sungai Aur	Muara Jambi	Sumatran Tiger
5	Jebus	Muara Jambi	Sumatran Tiger
6	Gedong Karya	Muara Jambi	Sumatran Tiger
7	Rantau Rasau	Tanjung Jabung Timur	Sumatran Tiger
8	Sungai Toman	Tanjung Jabung Barat	Sun Bear
9	Pematang Lumut	Tanjung Jabung Barat	Sun Bear
10	Pandan Lagan	Tanjung Jabung Timur	Sun Bear
11	Dusun Kebun	Tanjung Jabung Barat	Sun Bear
12	Sepucuk Jambi	Tebo	Sumatran Elephant

Sungai Gelem was targeted as one of the key villages for socialisation and training, because it was the home to eight of the nine victims of tiger attacks in the Jambi area in 2009. However, the victims were all undertaking illegal logging activities in the area at the time of the attacks. Observations carried out by the team during 2010 uncovered evidence that showed illegal logging activities were still occurring, further reducing key habitat and increasing the likelihood of human wildlife conflict. Information was passed onto the relevant part of the BKSDA agency that deals directly with illegal logging.



The team have also dealt with indirect conflicts where evidence of tiger presence such as footprints or scrapings was found. In incidents such as these the team demonstrates to villagers how to construct and use tiger scaring devices to prevent any further attacks.

Patrolling TN Berbak



The unit conducts regular monthly patrols within TN Berbak, and varies the routes to take in as much of the Berbak ecosystem as possible. This reduces the possibility of poachers being forewarned and so increases the chance of the team encountering poachers, whilst at the same time maximising the amount of ground covered overall within the park boundaries. During the course of these patrols any snares the team comes across are removed and the locations recorded. On one occasion the unit came across a known poacher's temporary accommodation or 'pondok'. As this hut was erected illegally in the park the patrol team dismantled the hut and removed

any materials that could have been used as snares or traps, thus hampering the poacher's efforts and deterring him and others from operating further.

Once the unit has finished the patrol, they pay an informal visit to the nearest village to discuss the danger of snares to tigers, the laws against poaching and the removal of wildlife from the national park. The team also discusses tiger conflicts with local communities and shares constructive ideas on mitigating such conflicts effectively.

Informant network

During the course of the year wildlife conflict issues were addressed both in the field and through community and stakeholder participatory events, including meetings and consultations involving relevant institutions and law enforcement agencies as well as socialisations, workshops and a poster campaign in local communities. As a result of these activities the UPKKL team has established an informal network for reporting wildlife crime and human-wildlife conflicts, while a more formal network was established by selecting 12 individuals living in target communities to be trained as community rangers. The purpose of these community rangers has been to provide a more formal communication network, immediate support to the community should a wildlife crime or conflict occur and, where needed, 'first on the scene' trained rapid response, assessment and securing of the area until the UPKKL team arrives.

Outreach and stakeholder participation

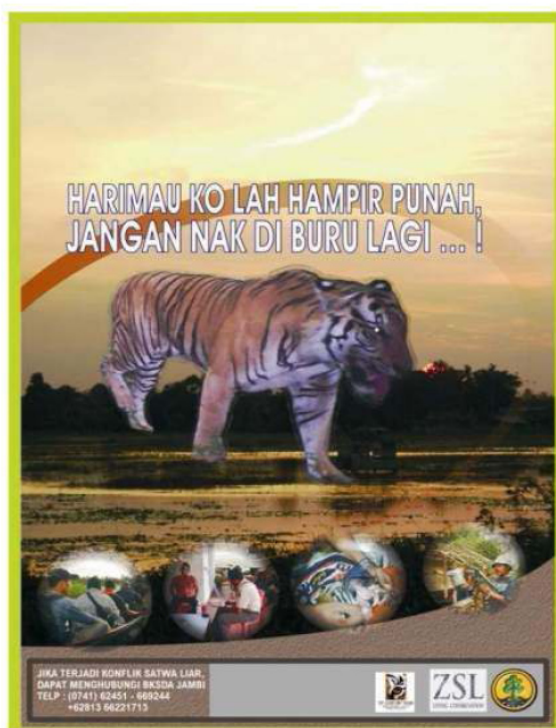
In May 2010 the team organised a Sumatran tiger conflict handling team road show, to promote the role and activities of the UPKKL to government departments and agencies that may have to deal with wildlife, wildlife crime and wildlife human-conflict. The aim of the road show was to raise the profile of the team, highlighting the work they team had been doing to date, answering any questions the various departments may have about the team and areas in which they may have suggestions of improving the team and or give support. It was hope that this would also facilitate and open lines of communication so the team would be contacted in the event any wildlife incidents observed by the various agencies. The team with a ZSL facilitator visited the Forest Department Jambi, TN Berbak, BKSDA Jambi, Police Department Jambi, Forestry Department Muaro Jambi and Korem (Military Command) 042 'Garuda Putih'.

A follow up governmental level meeting was held in August, attended by the team, the Country Coordinator of ZSL Indonesia Dolly Priatna and Laura D'Arcy, the Head of the National Park, Head of BKSDA Jambi, representative from the head of DINAS Maura Jambi Forestry, and a representative from DINAS Kehutan Provinsi. Future activities of the unit were discussed including identifying ways in which the unit could act as a conduit to improve communications between the departments through regular reporting. Continuing official support for the unit was agreed, with a long term commitment of these agencies to continue to provide staff to be seconded to the UPKKL team and BKSDA maintaining the co-ordinating role through Pak Nurazman.

Wildlife crime poster

A poster campaign was devised as a method to raise awareness in communities of the protected status of the Sumatra tiger and to raise the profile of the UPKKL. The poster included details of the 24-hour emergency phone line of the unit, and villagers were informed that they could call at anytime in the event they had any information regarding wildlife crime or conflict. Calls made to the hotline have been few in number so far but are slowly increasing as the unit continues to make informal visits to the communities around the park and answering the calls of communities in distress.

Several unit members unit attended a training event held by the WCS wildlife crime detection unit, attended by representatives working in wildlife crime throughout Sumatra. This gave them further crime detection skills including identifying tiger parts preserved for traditional Chinese medicine.



Investigations

The unit is currently investigating a possible wildlife crime case using surveillance, interviews and evidence collection, however conflicting reports have been identified in interviews carried out and one of the informants in the case has gone to ground. The team are still pursuing the case with the view to identify further potential witnesses. However due to the innate nature of the illegal wildlife trade, the intimidation and bribery of informants and witnesses are rife, therefore unless the perpetrator is caught red-handed, securing sufficient evidence to bring a case to court for a successful conviction, such investigations are a long and delicate process.

BKSDA Jambi stated

'The role of the UPKKL is strongly needed and has been key in handling wildlife conflict in the province of Muaro Jambi, assisting in the regions of Batanghari Regency and Merangin. We hope the team can increase this performance in the future with more facilities, recruitment of more members and law protection'

Unit review

A review of the impact of the unit was carried out in the agencies from which team members were recruited and communities in which they have worked. The response was resoundingly positive. Areas identified as strengths of the team were;

- Quick response time to wildlife crime and conflict in communities; communities felt supported
- Strong relationships with communities, from consistent visits /follow ups after conflict events
- Training community members and leaders in using mitigation advice
- Increased awareness in communities of the protected status of the Sumatran tiger

Areas where it was felt that the team needed to improve were;

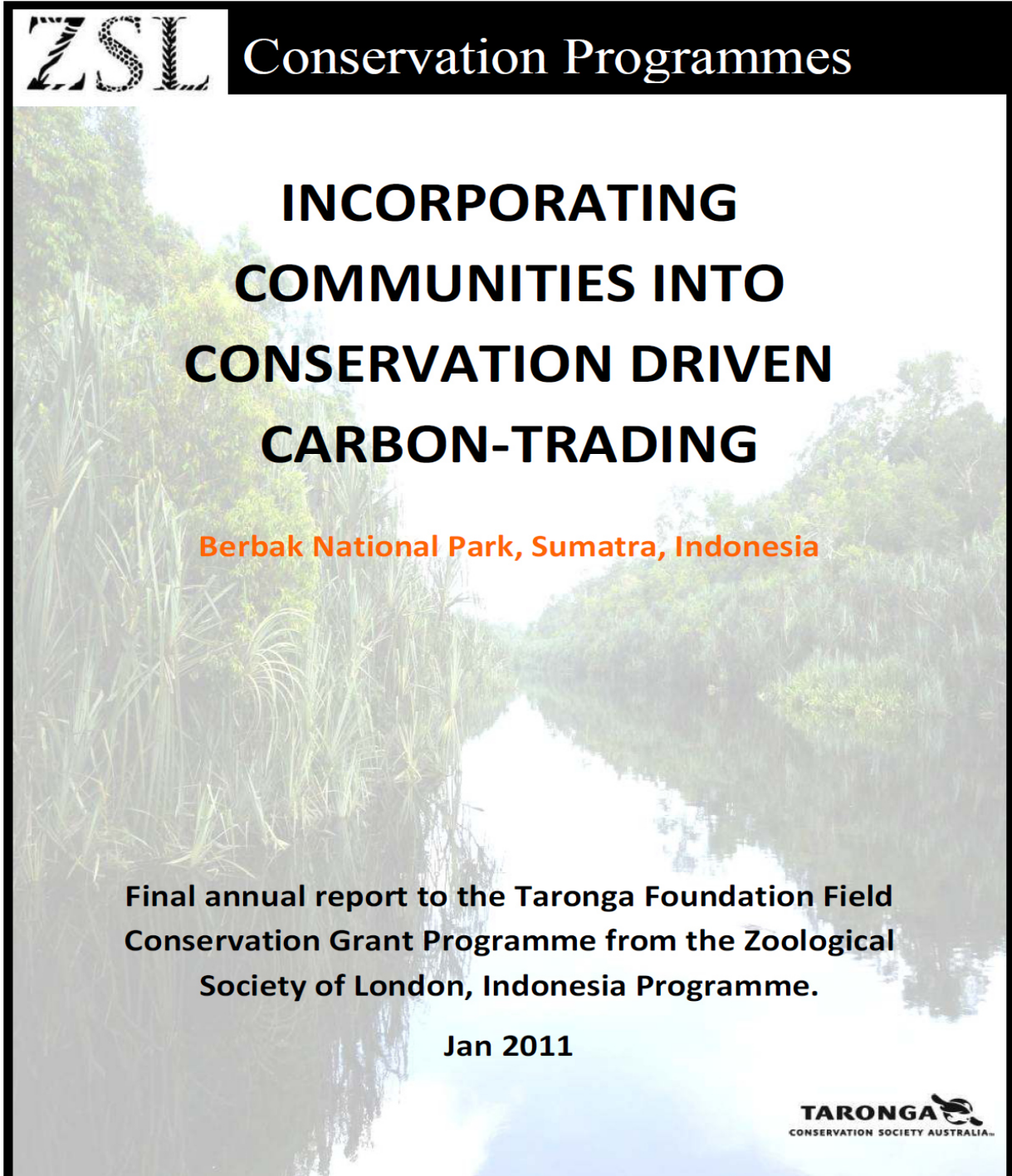
- Time management balancing work commitments and commitment to the UPKKL
- Target further communities in potential areas of wildlife crime to strengthen relationships and trust as there is still reluctance to contact, or work with team.
- Area and frequency of patrols within the national park boundaries

Future progress of the Unit

The UPKKL Wildlife Crime Unit aims in future to reinforce the foundations that it has established within the community and with stakeholders, and to begin to extend the capabilities of the unit's members. The key objectives building upon the successes of this unit to date are:

1. Identify other members of Berbak National Park forest police and BKSDA forest police for training to further support the core of the Berbak wildlife crime unit
2. Further training exercise with the PHSTKS in Kerinci, to focus specifically on the processing of a wildlife investigation until conviction – a specialised and difficult area
3. Strengthen and extend the information network across the Berbak region, specifically:
 - a. Provide the volunteer Community Rangers, of whom there is now one in each major settlement within the area of interest, with further training and a stipend allowing them the opportunity to join the unit during its activities at least once in the year.
 - b. have at least one informant in each major settlement of the area of interest
 - c. establish good relationships with local police offices
4. Maintain the wildlife conflict/crime hotline, respond to all calls, and continue with wildlife crime prevention and detection

Overall both the stakeholder and community responses to the UPKKL unit have been very positive, the goals which were set out during the grant period have to the best of the unit's capabilities have been achieved. The capacity and skills to deal with wildlife detection and conviction is one that is steadily being built on as the trust between the communities and the unit are built on further. The UPKKL team has begun to be widely respected by public in Jambi for its dedication in resolving wildlife conflicts and crime a reputation which the unit it is hoped will have the opportunity to build upon.



Project Title: Incorporating local communities into a carbon-based wildlife conservation project in Sumatra.

Conservation Benefits

Changes to the projects

Please provide a brief description of any changes to the project described in the application that were made during the year and the reasons for those changes.

The project brief has been subject to several changes since the initial proposal.

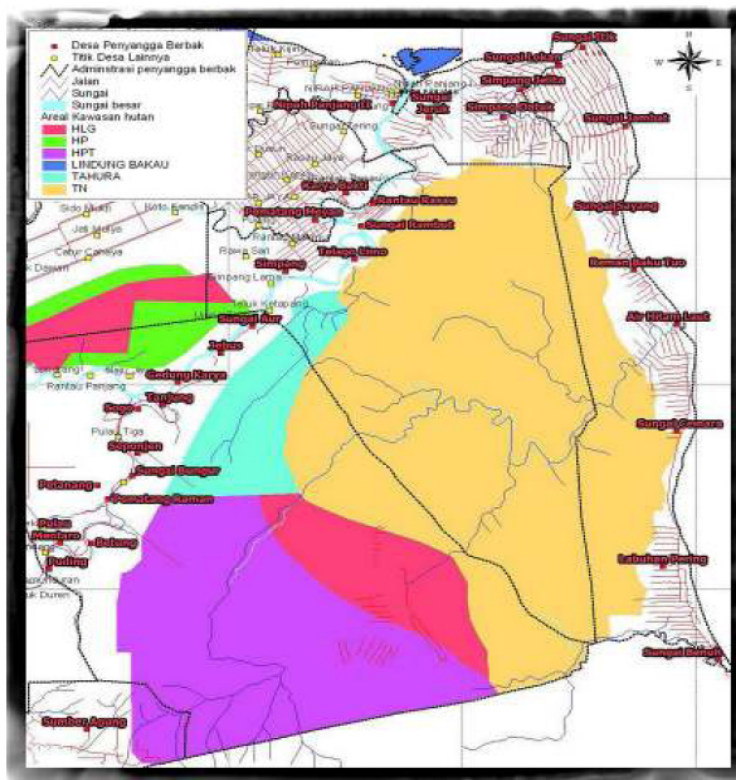
1. Partner change. Due to staffing changes Gita Buana, the NGO originally approached to carry out the community baseline surveys, were unable to undertake the work and we instead appointed Walestra, another local social focused NGO with a long history of working in the area.
2. Work slowed by exceptionally heavy rains caused by El Niña (often follows El Niño). Access to the villages became much more difficult than usual for most of the year, resulting in escalated travel costs and time.
3. Need to rebuild trust. We were not aware, until conversations began, that some villages had had previous negative experiences with government departments collecting socio-economic data. These types of data were very different from those ZSL/Walestra were collecting, but the differences needed to be explained clearly and this took time. Hence, the baseline information wasn't completed until late May.
4. During 2010 there were increasing levels of illegal logging in the currently vacant logging concession area southwest of Berbak National Park. This resulted in very high levels of tension between the communities there and the government agencies attempting to deal with the problem. Given that we also had a shortfall in travel funds due to the rain and so could not reach every village in any case, it was decided not to focus further on the more difficult to reach villages for the time being, and the remaining money being diverted to dealing with this issue. Whilst a priority has been set to revisit the villages data has already been collected in for further work, we hope to secure further funding in 2011, so that we can carry out baseline work in the villages that were missed.

Did you achieve the planned activities and were the expected outcomes achieved? How are you measuring this success in terms of a) key threatening process and b) population and habitat viability?

Good progress was made towards all of the four objectives in the original proposal, though for objectives 2 and 3 we were not able to carry out all the activities intended. We will further measure success in securing village support by using qualitative questionnaires during 2011, however it is already clear (see below) firstly that the villagers are beginning to comprehend the potential benefits of such mechanisms as REDD and secondly that the best way to convince them fully is going to be to demonstrate benefits in practical terms by accessing already established government community funding schemes, ideally as soon as this can be arranged

1. To establish the community 'baseline' for the project (spatial boundaries, the demographics of communities included and determining their relationship with the Berbak forest)

We have mapped all the relevant communities and identified four principal communities to work with, chosen using the ranking criteria (1) closest to the national park boundary, (2) high levels of dependency level on the forest for income, (3) socio-economic data (ethnicity and household income) and (4) prior support received in the past from government agencies.



Map 1 - Index Map for Website front page

A database of the information gathered will be made available to all of the communities, NGOs, government agencies and other stakeholders during 2011, with the agreement of the villagers. For this purpose the results have been prepared in an Indonesia Bahasa language web database format. This database is intended to go live by mid-2011.

The website will include a dynamic map (Map 1) which will allow user to obtain comprehensive information on the economic and social needs of each of the communities for future REDD revenue requirements and planning.

2. *To raise levels of understanding and support for a carbon-based approach to conserving the Berbak forests*

Once access improved a successful information campaign was run in the communities around the Berbak NP, highlighting the importance of the area, the value of REDD and the need to protect Berbak's wildlife especially Sumatran tigers. The campaign was promoted by ZSL in an REDD road show hosted by several community NGOs across the park buffer zone. Specially designed calendars were distributed to communities, to reinforce the message that conservation of habitat and important species such as the tiger will in turn lead to an increase in funds available to villages and to individuals who are willing to reduce deforestation.



Workshops for community leaders and village committee heads were held in the four key communities mentioned above, to provide an introduction to basic principles of REDD in order to gain support for REDD activities. These activities are leading up to obtaining position statements from each community in support of REDD+; however further visits/workshops are still needed and these will be undertaken in 2011 (see next section).

3. *To establish a framework for local community representation and engagement in project development with clear channels for feedback*

Twelve "Ambassadors" from the four villages chosen were introduced to the core principles of REDD and REDD+ and trained in needs assessments and strategic planning, so that they could return to their villages, identify areas of needs for the villages and work with other principal village representatives on addressing those needs.

The villages from where the Ambassadors were sourced were visited in November, three months after the training, to determine the success of the training and whether the scheme would be adopted in their villages. Over 70% of the participants had shared their knowledge about how their villages might take advantage of REDD and associated funding sources to develop. However, of that 70% over half stated that they had problems working with other community members in classifying the village's current condition (needs assessments) so that areas of need could be identified before a strategic plan could be identified. Continued support for these Ambassadors through further assistance with village led workshop is planned for 2011.

4. *To determine priorities for future revenue disbursement based on community needs and desires*

As discussed previously we made good progress here but further work is needed to ensure that there is full agreement among the villagers on the best way forward for them. During discussions we identified a local funding source that can be used to progress this part of the work: the National Community Empowerment Program (PNPM) Mandiri scheme. This scheme invites applications from communities, and is a Ministry of Home Affairs programme aimed to stimulate sustainable economic growth and local livelihoods by ameliorating poverty through employment. The programme is split into 3 stages each having a clear measure of success

- Stage 1 Planning: Community ambassadors work with village groups to identify the needs of villages. Measure of success: Consultative assessment completed identifying a scheme which can meet communities needs e.g. Women's health education programme.
- Stage 2 Application: The ambassador with the assistance of community leaders completes an application for the scheme. Measure of success: Application form submitted.
- Stage 3 Award: Application is successful so funds awarded to the community to undertake the scheme and the funds dispersed accordingly. Measure of success funds dispersed and programme starts.

If the uptake of the PNPM scheme by the targeted communities is high and applications successful it will over all be classified as a further success. The framework of the scheme will be evaluated and reviewed for its potential use as a process by which REDD revenues could be obtained and disbursed to local communities.

Despite the setbacks that the project had in the initial phases, overall we have been successful in raising the awareness of Carbon finance mechanisms, REDD principles and Sumatran tiger conservation through the Berbak buffer region. This has allowed ZSL to build upon and strengthen ties with the communities building levels of transparency, communication and trust essential to future successful community projects.

Under a separate grant ZSL has also been coordinating a wildlife crime unit staffed by local and provincial forest police. The unit has received very positive feedback from homes and villages where the REDD road show visited and the calendar was in place. Wildlife crime and poaching has already begun to see a down turn as direct result of the combined efforts of wildlife crime unit and the Walestra/ZSL socialisation being carried out in the surrounding villages. These activities have directly contributed to building trust and communication and we will continue to link this work with the REDD preparations in the future. This will assist villages to get a clear understanding that conservation work and potential sources of income are both part of the same overall effort, and their future prosperity will be better served by using their forests sustainably than by short-term exploitation.

Was TCSA funding valuable to the completion of the project? Please provide a statement of expenditure showing the amount of funds received, how the funds were expended and the balance remaining at the date of the report.

TCSA funding was essential to this project! Community engagement could not have been initiated without it particularly with the dramatic increase in transport cost experience this year. We have made a very good start here with limited funds and are now able to identify the key areas for further work in 2011 to ensure the overall REDD+ project has full support from the local communities when it moves to the implementation phase in 2012-14.

If you have not been able to achieve your planned outcomes please describe if you still expect to do so in the future and how your plans will be modified to achieve these outcomes. If the planned outcomes are not able to be achieved please describe what you would do differently given the same opportunity again.

Further needs assessments will have to be carried out in the villages already surveyed to ensure that a cross section of key community players are met, as interest has been expressed from under represented parties (young people 15-21) and female groups. Therefore it is intended (funds permitting) to continue to build relationships with the pivotal community members but also to targeted under represented groups such as these to determine potential 'whole community' needs.

Overall the project initial design was ambitious for the time-frame set, even if the field conditions had been perfect. This was the first time we had undertaken such full community socialisation project and we now have a much better understanding of the problems and processes required.

However the initial surveys, baseline information, introductions, socialisation and community training have all been undertaken to a sound and fundamental level. It is vital now that this trust and rapport with the communities is built upon further. Data collected from these villages are now much more likely to be closer to their true perceptions of REDD, as will provide a sound reference level for gauging changing of opinions and perception in the future. These data provides us with clear guidance on what will approaches will need to be undertaken to dissuade villagers from current destructive activities, and work out exactly how alternative, sustainable livelihood options could work for them.

Were there any additional benefits or unforeseen consequences that occurred during the year or prior to project completion?

The weather in 2010 (the grant year in question) was subject to high levels of rain resulting from the El Niña weather event. This resulted in transport costs and difficulties through out the year as roads were often flooded and damaged, therefore we had to use much more expensive water based transport. It also may have affected the accuracy of some of the baseline data collected as this year does not present a 'typical' year, this must therefore be taken into account in future planning.

The ZSL community team were able to respond to rising tensions between the government and local communities as a result of illegal logging activities being carried out in a nearby logging concession. The team assisted with conflict resolution meetings attended by stakeholders with the areas of tension to providing impartial mediator roles between the villagers and the local government. Resulting in reduced tensions, an increased understanding of the consequences of deforestation with the communities and further securing ZSL's profile in the community.