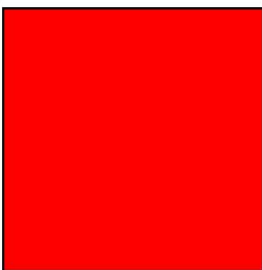
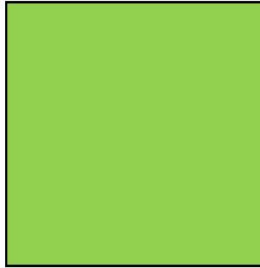
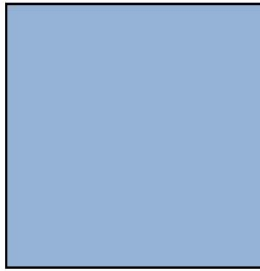
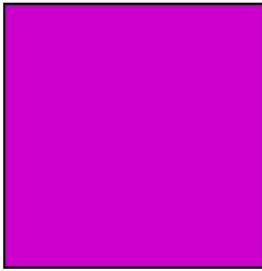


LAPORAN TAHUNAN
2012 - 2013

PRAKARSA KARBON BERBAK
Berbak Carbon Initiative

SEPTEMBER 2013





ZSL
LIVING CONSERVATION

PRAKARSA KARBON BERBAK
(Berbak Carbon Initiative)
LAPORAN TAHUNAN
OKTOBER 2012 – SEPTEMBER 2013

Disusun oleh:

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Zoological Society of London Indonesia
Bogor, 2013

Risalah eksekutif

Dokumen ini merupakan Laporan Kemajuan Tahun ke-2 Proyek Prakarsa Karbon Berbak disingkat PRO BERBAK (*Berbak Carbon Initiative*) untuk periode 12 Oktober 2012 sampai dengan 11 September 2013. 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 karbon dan biodiversitas, 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 17 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 Kawasan 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.

Pencapaian penting PRO BERBAK tahun ke- 2

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

Rencana kegiatan prioritas PRO BERBAK pada tahun kedua sebagaimana telah ditetapkan dalam Laporan Tahunan 2011 – 2012 yang mencakup 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 emisi yang bersumber dari 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.

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

- Terbangunnya Petak Sampling Permanen seluas 6 (enam) hektar yang dilengkapi jalan setapak pengamatan untuk pelaksanaan kegiatan pemantauan fenologi hutan dan serasah hutan di dalam kawasan Taman Nasional Berbak.

- Diteruskan pengumpulan data karbon hutan dan biodiversitas, khususnya tumbuhan, satwa liar (mamalia, burung dan gibbon)
- Dilanjutkan kegiatan penanganan konflik manusia dengan populasi harimau Sumatera dan habitatnya sebagai salah satu model upaya pengurangan emisi karbon.
- Diterbitkannya Keputusan Menteri Kehutanan No Kehutanan No. 549/ Menhut-II/2013 tentang Persetujuan Penyelenggaraan *Demonstration Activities* (DA's) REDD pada Taman Nasional Berbak Seluas 142.750 hektar.
- Diterbitkan Surat Kepala Dinas Kehutanan Provinsi Jambi Provinsi No 3111/BHKA-43/IV/2013 tentang Persetujuan lokasi *Demonstration Activities* REDD + di Taman Hutan Raya Tanjung.
- Diselesaikannya Dokumen Strategi dan Rencana Aksi REDD+ Provinsi Jambi Tahun 2012 - 2032 yang direkognisi dengan Keputusan Gubernur Jambi No 352/Kep.Gub/Setda Ekbang & SDA-4.2/2013 tentang Strategi dan Rencana Aksi REDD+ Provinsi (SRAP) 2012-2032. SRAP REDD+ merupakan penjabaran Strategi Nasional REDD+ yang telah direkognisi oleh Satuan Tugas REDD+ Indonesia yang sekarang oleh Badan Pengelolaan REDD+.
- Telah diperoleh pendanaan baru luar negeri dari Tropical Forest Conservation Action (TFCA)-Sumatera sebesar Rp. 5.248.925.000 selama 3 tahun untuk **"Proyek Pelestarian Habitat dan Populasi Harimau Sumatera di Bentang Alam Berbak"** melalui Konsorsium Ko-Roar Berbak (Perkumpulan Gita Buana, Walestra, ZSL) guna mendukung kelanjutan kegiatan persiapan dan pengujian insentif REDD+ di Lansekap Berbak, termasuk Taman Nasional Berbak.
- Telah diperoleh pendanaan dari Clinton Climate Initiative sebesar USD 57.100 selama 1 tahun untuk Proyek **"Awareness and capacity building on REDD+ for communities and stakeholders in the buffer zone around Berbak National Park in Jambi Province, Indonesia"** melalui Perkumpulan Gita Buana untuk mendukung kegiatan sosialisasi dan persiapan masyarakat lokal, pemerintah kabupaten dan pemerintah provinsi dalam implementasi REDD+ di Taman Nasional Berbak.
- Telah teridentifikasi potensi lembaga-lembaga donor baru luar negeri untuk mendukung kelanjutan kegiatan persiapan REDD+ dan implementasi penuh REDD+ dalam jangka panjang, seperti Athelia Climate Fund, Millinium Challenge Compact, Fund for REDD Indonesia, USAID – Global Development Alliance, Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH.

PRO BERBAK mengakhiri tahun ke-2 dengan memperkuat pondasi informasi dasar dan pendanaan tambahan yang diperlukan untuk melaksanakan fase kesiapan REDD+ (*readiness phase*) di Lansekap Berbak, termasuk di Kawasan Taman Nasional Berba. Selain

itu telah menciptakan kondisi pemungkin yang lebih kuat berupa kebijakan nasional dan regional yang kondusif untuk implementasi penuh REDD+ di Bentang Alam Berbak, termasuk di Kawasan Taman Nasional Berbak.

Berbagai sub-kontraktor dan mitra teknis telah menyediakan keahlian teknis dalam cakupan yang luas, seperti Perkumpulan Gita Buana dan Deltares. PRO BERBAK berharap agar komitmen masyarakat lokal terhadap konservasi hutan dan lahan gambut serta mata pencaharian berkelanjutan serta kerjasama dengan para pihak pemangku kepentingan baik dari kalangan pemerintah pusat dan daerah akan lebih kokoh lagi untuk dapat bekerja sama dalam menjaga kelangsungan kegiatan PRO BERBAK di masa depan.

Tantangan dalam pelaksanaan proyek tahun 2

PRO BERBAK merupakan proyek ambisius yang dilaksanakan dalam kondisi yang penuh tantangan dan masih dalam ketidakpastian penerapan skema REDD+ dalam rejim perjanjian iklim global pasca Kyoto Protokol. Disamping itu, melibatkan isu-isu yang sensitif secara politis di bentang alam terpencil seperti Bentang Alam Berbak, khususnya dalam pemanfaatan dan penggunaan kawasan hutan dan lahan gambut yang menyebabkan terjadinya deforestasi dan degradasi hutan.

Tantangan kegiatan persiapan dan implementasi REDD+ di Taman Nasional Berbak dan di Lansekap Berbak pada umumnya adalah mencapai keberhasilan pelaksanaan REDD+ itu sendiri, karena kunci keberhasilannya adalah harus dapat memanfaatkan pengetahuan lokal, ilmu baru, kelembagaan baru, keterlibatan para pihak kunci dan mekanisme baru pendanaan iklim berbasis kinerja untuk mengkatalisasi kegiatan ekonomi hijau yang dapat menghasilkan multi-manfaat bagi Lansekap Berbak, baik dari sisi pengurangan emisi karbon, kelestarian keanekaragaman hayati, kesejahteraan ekonomi masyarakat dan perbaikan tata kelola kehutanan.

Tantangan lain adalah REDD+ membutuhkan kepastian spasial untuk implementasi REDD+ secara penuh. Di Provinsi Jambi, sampai pelaporan ini dibuat Rencana Tata Ruang Wilayah Provinsi Jambi sebagai rujukan Rencana Tata Ruang Kabupaten kemantapan spasial belum terselesaikan. Hal ini disebabkan oleh kurangnya koordinasi antara pemerintah pusat, pemerintah kabupaten dan provinsi tentang rencana tata ruang. Sedangkan rencana tata ruang provinsi seringkali beroreintasi 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 oleh masyarakat lokal, perkebunan kelapa sawit dan konsesi penebangan kayu hutan alam.

Sistematika Laporan Tahunan

Laporan Tahunan ini disajikan dalam tiga bagian utama: a) Bab 1 menjelaskan arahan program kerjasama dan Rencana Kerja Lima Tahunan yang disepakati ZSL Indonesia, Balai Taman Nasional Berbak dan Direktorat PJLK2HL Kementerian Kehutanan, b) 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. c). Bab 3 memberikan ringkasan tentang tantangan implementasi pelaksanaan dan rencana prioritas pada Tahun Ke 3. Lampiran pada akhir laporan memaparkan rincian laporan teknis dan dokumentasi lainnya yang dihasilkan oleh Proyek 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. Adapun tujuan antaranya (sub-tujuan) adalah menciptakan dan memanfaatkan insentif keuangan melalui skema REDD+ bagi pengelola lansekap Taman Nasional Berbak dan unit pengelola hutan lainnya di Lansekap Berbak 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 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
<p><u>TUJUAN AKHIR:</u></p> <p>Melestarikan keanekaragaman hayati, potensi karbon dan ekosistem hutan rawa gambut di TN.Berbak</p>	<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	<p>Laporan pemantauan karbon berbasis sistem satelit</p> <p>Laporan pemantauan karbon dan inventarisasi hutan berbasis petak sampling permanen</p> <p>Laporan penilaian dan pengelolaan kebocoran karbon hutan</p> <p>Laporan tahunan penilaian keanekaragaman hayati</p> <p>Laporan survei ekonomi komunitas lokal pada awal dan akhir proyek</p> <p>Laporan KAP (Knowledge, Attitude , Perception) pada awal dan diakhir proyek</p>

NARATIF ARAHAN PROGRAM	INDIKATOR KINERJA/HASIL PENCAPAIAN	ALAT VERIFIKASI
<p>TUJUAN :</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>OUTPUT 1:</p> <p>Pembentukan kelembagaan kolaboratif berbasis para pihak dan kerangka kerjasama serta modeling MRV dan penggalangan pendanaan 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>OUTPUT 2 :</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>OUTPUT 3 :</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>OUTPUT 4:</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>OUTPUT 5 :</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 pemantauan tutupan 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 implemmentasi 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 hutan gambut terdegradasi 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 dan toleran lahan basah dilaksanakan</p>	<p>1. Laporan operasi patroli hutan 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 terdegradasi yang dibasahi kembali , dikonservasi dan direhabilitasi</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 pohon dan pohon muda</p>

NARATIF ARAHAN PROGRAM	INDIKATOR KINERJA/HASIL PENCAPAIAN	ALAT VERIFIKASI
<p>OUTPUT 6 :</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. KELEMBAGAAN, PENDANAAN, VALI DASI DAN MRV OUTPUT 1: Pembentukan kelembagaan kolaboratif berbasis para pihak dan kerangka kerjasama serta modeling MRV dan penggalangan pendanaan yang dibutuhkan untuk mengoperasikan pendapatan ekonomi berbasis karbon	1. Penyusunan Keputusan Dini Tanpa Paksaan Berdasarkan Informasi Lengkap Sejak Awal (<i>Free Prior and Informed Consent /PPIC</i>) 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		
	11. Rancang Disain						

PROGRAM DAN NARATIF ARAHAN PROGRAM	INDIKATOR KINERJA/HASIL PENCAPAIAN	URAIAN KEGIATAN	TAHUN					
			I	II	III	IV	V	
	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 di pasar sukarela atau mandatori yang membeli atau memberikan insentif keuangan untuk kelangsungan pendanaan implementasi REDD+ di lansekap Berbak	1. Penulisan PDD REDD+ CCBS 2. Melakukan validasi PDD VSC 3. Melakukan validasi PDD CCBS 1. Melakukan identifikasi donor, penawaran dan negosiasi dengan pihak investor dan lembaga donor			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. Nilai karbon dikalibrasi di lapangan dan didasarkan 6 hektar Petak Sampling	1. Melakukan analisis perubahan penutupan hutan selama 10 tahun terakhir 1. Melakukan survei potensi karbon di petak yang telah ditetapkan dan menentukan Permanen Petak Sampling	X	X				

PROGRAM DAN NARATIF ARAHAN PROGRAM	INDIKATOR KINERJA/HASIL PENCAPAIAN	URAIAN KEGIATAN	TAHUN					
			I	II	III	IV	V	
	Permanen (PSP) 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		X				

PROGRAM DAN NARATIF ARAHAN PROGRAM	INDIKATOR KINERJA/HASIL PENCAPAIAN	URAIAN KEGIATAN	TAHUN				
			I	II	III	IV	V
	<p>penyangga TN Berbak diinvestigasi dan dianalisis</p> <p>10 Deforestasi terencana oleh pemerintah regional diinvestigasi</p> <p>11. Rincian kegiatan pengurangan emisi , reduksi emisi, ketersediaan metodologi verifikasi dan biaya dihitung dan dianalisis</p>	<p>kawasan hutan produksi di kawasan penyangga Taman Nasional</p> <p>1. Melakukan survei dan analisis terhadap pengembangan wilayah yang menyebabkan terjadinya deforestasi terencana.</p> <p>1. Melaksanakan studi kepustakaan dan analisis terhadap kegiatan-kegiatan reduksi emisi</p>			X		
				X	X		
<p>C. MARKA DASAR KO-BENEFIT BIODIVERSITAS DAN MASYARAKAT</p> <p>OUTPUT 3 :</p> <p>Kuantifikasi nilai marka dasar (base line) ko-manfaat (keanekaragaman hayati, masyarakat) dan hubungan dengan nilai marka dasar karbon</p>	<p>1. Keanekaragaman hayati (satwa harimau, burung, gibbon) setidaknya berdasarkan 100 petak sampling dinilai dan dianalisis</p> <p>2. Sosial ekonomi Komunitas lokal minimal 30 % populasi penduduk dinilai</p>	<p>1. Mengadakan infrastruktur riset</p> <p>2. Melakukan monitoring keberadaan dan populasi harimau Sumatera dan satwa pemangsang serta habitatnya melalui jebakan kamera</p> <p>3. Melakukan survei keberadaan dan populasi primata gibbon</p> <p>4. Melakukan survei keanekaragaman hayati burung</p> <p>5. Melakukan monitoring fenologi hutan dan serasah hutan</p> <p>1. Melakukan inventarisasi dan pengumpulan data dasar sosial masyarakat di sekitar TN. Berbak</p> <p>2. Melakukan kajian persepsi dan</p>	X	X	X		
			X	X	X		
				X	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 pengembangan ekonomi alternatif berbasis lahan yang ramah lingkungan lahan gambut (<i>smart climate agriculture</i>)				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 dan diluar TN Berbak dengan jenis lokal cepat tumbuh dilaksanakan	1. Melakukan penanaman kembali kawasan bekas kebakaran di dalam Taman Nasional dan sekitarnya dengan jenis-jenis pohon lokal yang 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 : Kesinambungan 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
			X	X	X	X	X
	4. Evaluasi kegiatan tahunan		X	X	X	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 kawasan konservasi rawa				X	X	X	

PROGRAM DAN NARATIF ARAHAN PROGRAM	INDIKATOR KINERJA/HASIL PENCAPAIAN	URAIAN KEGIATAN	TAHUN				
			I	II	III	IV	V
		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 tahun ke 2

A. KOMPONEN KEGIATAN : Kelembagaan, Pendanaan, MRV dan Validasi

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

Salah satu kegiatan yang telah dilaksanakan pada tahun kedua dalam mencapai out-put ini adalah melanjutkan sosialisasi Program REDD+ pada desa-desa yang berbatasan dengan TN. Berbak. Kegiatan ini bekerjasama dengan Perkumpulan Gita Buana dan Balai Taman Nasional Berbak yang didanai oleh *Clinton Climate Initiative*. Kegiatan ini ditujukan untuk mengetahui sejak awal aspirasi dan rencana masyarakat lokal untuk terlibat dan bekerjasama dalam Program REDD+ dan terkait proses Padiatapa atau FPIC (*Free, Prior, Informed and Consent*) dalam REDD+. Lokakarya kampung telah diselenggarakan sebanyak 6 kali dengan melibatkan 321 orang yang merupakan perwakilan dari 28 desa disekitar Taman Nasional Berbak.



GAMBAR 1. Proses lokakarya kampung sekitar Taman Nasional Berbak mengenai sosialisasi dan kesiapan masyarakat lokal dalam perencanaan dan implementasi REDD+

Melalui serangkaian kegiatan ini, maka telah dihasilkan hal-hal sebagai berikut :

- Para pihak di daerah mendapatkan informasi dan gambaran situasi internasional dan nasional terkini tentang perubahan iklim dan skema REDD+.
- Terkumpulnya aspirasi di daerah dalam penanggulangan perubahan iklim melalui Skema REDD+.
- Teridentifikasinya peluang, hambatan dan kebutuhan lokal untuk implementasi REDD berdasarkan kondisi nyata di lapangan
- Terbangunnya kesamaan pemahaman para pihak di daerah dalam merespon perkembangan skema REDD+ kedepan.

Terkait dengan pencapaian output ini juga telah dilakukan pembicaraan mengenai pelibatan kerjasama pengembangan kegiatan REDD+ di Lansekap Berbak dengan para pihak pengelola kawasan hutan yang bertetangga dengan Taman Nasional Berbak, seperti Dinas Kehutanan Provinsi Jambi sebagai unit pengelola Taman Hutan Raya Tanjung, PT. Putraduta Indah Wood dan PT. Pesona Belantara Persada sebagai pengelola Hutan Produksi Terbatas dan Dinas Kehutanan Muaro Jambi sebagai pengelola Hutan Lindung Gambut Air Hitam Dalam.



GAMBAR 2. Kepala Balai TN. Berbak - Drh Hayani Suprahman sebagai salah satu nara sumber dalam kegiatan sosialisasi REDD+

Pada periode tahun ke 2 pelaksanaan PRO Berbak, kegiatan persiapan dan pengujian insentif positif REDD+ telah memperoleh dukungan pendanaan baru dari Tropical Forest Conservation Action (TFCA)-Sumatera sebesar Rp. 5.248.925.000 selama 3 tahun untuk "**Proyek Pelestarian Habitat dan Populasi Harimau Sumatera di Bentang Alam Berbak**" melalui Konsorsium Ko-Roar Berbak (Perkumpulan Gita Buana, Walestra, ZSL).

Berbak sebagai salah satu kluster lokasi proyek rintisan (*project starter site*) di Indonesia untuk mendapatkan investasi pendanaan pada tahun 2014 untuk membiayai kegiatan perencanaan penggunaan lahan partisipatif, pengelolaan sumber daya alam berkelanjutan sektor kehutanan, perikanan dan pertanian dan energi terbarukan. Detail pencapaian output ini dijelaskan terperinci pada Lampiran 1.

Lembaga donor Millenium Challenge Account Indonesia (MCA-I) – Green Prosperity telah mengidentifikasi dan memasukan Lansekap

Salah satu capaian penting pada output 1 adalah diterbitkan Surat Kepala Dinas Kehutanan Provinsi Jambi No. No 3111/BHKA-43/IV/2013 tanggal 11 April 2013 mengenai persetujuan lokasi dan penyelenggaraan DA REDD+ di Taman Hutan Raya Tanjung. Penerbitan ini berdasarkan Surat ZSL No. 81/A/ZSL/II/2013 tanggal 17 Pebruari 2013 mengenai Proposal Persetujuan Lokasi DA REDD+ di Taman Hutan Raya Tanjung. Lihat Lampiran 2.

Tonggak penting lainnya dalam pencapaian output 1 adalah diterbitkannya Keputusan Menteri Kehutanan No Kehutanan No. 549/ Menhut-II/2013 pada tanggal 31 Juli 2013 tentang Persetujuan Penyelenggaraan *Demonstration Activities* (DA's) REDD pada Taman Nasional Berbak Seluas 142.750 hektar. Penerbitan Keputusan Menteri Kehutanan ini didasari atas Surat No. S-401/BTNB-1/2012 tertanggal 26 September 2012 dari Balai Taman Nasional Berbak bersama Zoological Society of London mengenai usulan registrasi lokasi DA REDD+ di Taman Nasional. Hal ini merupakan Keputusan Menteri Kehutanan pertama di Indonesia untuk memberikan persetujuan lokasi dan penyelenggaraan DA REDD+ pada kawasan konservasi di Indonesia. Lihat Lampiran 3.

B. 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 pengumpulan data dasar pada tahun kedua masih diteruskan, khususnya kegiatan pemantauan populasi dan habitat harimau Sumatera, burung, primata gibbon, fenologi hutan dan serasah hutan.

Sebanyak 62 stasiun penjebak kamera telah dipasang di dalam Taman Nasional Berbak pada periode tahun ke dua ini.

Dan pada kurun periode ini telah dilakukan analisis data terhadap hasil kamera penjebak satwa liar di Taman Nasional Berbak dari tahun 2007 sampai tahun 2011. Selama 7.183 hari pemasangan kamera penjebak telah menghasilkan 965 foto yang terdiri dari 29 jenis mamalia, 8 jenis burung dan 1 jenis reptilia. Secara khusus untuk satwa harimau Sumatera telah diketahui populasinya sebanyak 22 individu dan 15 individu telah diketahui merupakan individu berbeda. Kepadatan harimau Sumatera di Taman Nasional Berbak diketahui 0,6 individu per-100 km² di habitat semak rawa gambut, 2,4 individu per-100 km² di habitat hutan gambut sekunder dan 0,2 individu per-100 km² di habitat hutan gambut primer. Secara detail hasil analisis dijelaskan pada Lampiran 4.



GAMBAR 4. Sebanyak 150 kamera penjebak satwa tipe Panthera dipasang di TN. Berbak untuk mengetahui keberadaan, sebaran dan populasi harimau Sumatera dan hewan pemangsanya



GAMBAR 5. Individu Harimau Sumatera yang berhasil direkam dalam hutan perbatasan TN. Berbak dan TN. Sembilang

Analisis hasil pemantauan jenis satwa burung dikaitkan dengan keragaman dan distribusi jenis pohon di Taman Nasional Berbak juga telah dilaksanakan pada periode tahun ke dua. Tercatat 177 jenis burung, diantaranya 166 jenis ditemukan di hutan gambut primer, 62 jenis ditemukan di hutan gambut sekunder, 42 jenis di hutan gambut semak, dan 51 jenis di

lingkungan hutan pantai. Jenis Crested Myna (*Acridotheres cristatellus*) yang bersifat *generalist* memiliki preferensi tertinggi untuk habitat di luar hutan gambut primer. Sedangkan jenis Rhinoceros hornbill yang bersifat burung *specialist* mempunyai preferensi tinggi di habitat hutan gambut primer yang tersisa. Lihat Lampiran 5 pada laporan untuk detailnya.

Pada tahun kedua ini, kegiatan pengumpulan data fenologi dan serasah hutan bulanan mulai dilakukan di lokasi Petak Permanen Sampling di Simpang Gajah yang terletak di pedalaman Taman Nasional Berbak. Sebanyak 3.440 individu pohon terus dipantau kondisi pembuahan dan pembungaannya dan sebanyak 50 perangkap serasah hutan juga terus dipantau



GAMBAR 6. Kegiatan pemantauan fenologi (pembuahan) pohon dan kelimpahan serasah hutan dilakukan pada 6 hektar Petak Sampling Permanen di Simpang Gajah TN. Berbak. Sebanyak 3440 pohon terus dipantau setiap bulannya kondisi fenologi nya dan 50 penjebak serasah telah dipasang untuk memantau kelimpahan serasah hutan

Dalam periode pelaporan ini juga telah dilakukan kajian persepsi masyarakat terhadap kegiatan konservasi alam selama ini, khususnya di Taman Nasional Berbak. Hasil analisis menunjukkan bahwa ada interaksi yang sangat kuat antara masyarakat dengan Kawasan Taman Nasional melalui ketergantungan yang cukup tinggi terhadap sumber daya alam kawasan hutan, seperti hasil hutan kayu, ikan, burung, harimau Sumatera, hasil hiutan bukan kayu dan sumber daya air. Terkait pelaksanaan REDD+, masyarakat akan memperoleh manfaat, apabila persiapam dan pelaksanaan melibatkan mereka dengan sesungguhnya dan menjadikan mereka sebagai mitra, subyek dan pusat pengembangan, Strategi berbasis insentif juga telah ditemukan untuk memberikan keseimbangan antara pemenuhan keinginan peningkatan ekonomi masyarakat dengan kegiatan pengurangan emisi karbon. Lihat pada Lampiran 6 untuk rincian laporan.

C. KOMPONEN IMPLEMENTASI KEGIATAN PENGURANGAN EMISI

OUTPUT 5: terlaksananya strategi dan rencana-rencana kegiatan penurunan emisi CO₂e

Pada tahun kedua, telah dimulai kegiatan perlindungan dan pengamanan kawasan untuk mengurangi deforestasi tidak terencana seperti penebangan liar dan perburuan satwa liar. Kegiatan ini difokuskan untuk menemukan model pengamanan kawasan Taman Nasional, khususnya penanganan konflik populasi dan habitat harimau Sumatera dengan manusia. Terkait dengan hal ini telah dibentuk dan beroperasinya Unit Penanggulangan Konflik dan Kejahatan Lingkungan Wilayah Ekosistem Berbak dan kemudian diubah menjadi Tim Reaksi Cepat Konflik Satwa dan Kejahatan (*Wildlife Conflict and Crime Response Team, WCCRT*) Terbentuknya lembaga ini telah berhasil dengan cepat menangani konflik manusia dan harimau Sumatera dan mencegah perusakan habitat harimau Sumatera di Lansekap Berbak, termasuk di Taman Nasional Berbak. Tim ini telah berhasil mengidentifikasi konflik satwa liar dengan manusia yang terjadi sepanjang tahun 2011 sampai 2012 dan beberapa kasus telah berhasil direspon dengan baik.

Tim terpadu ini beranggotakan Pegawai Negeri Sipil (PNS) dari Balai Konservasi Sumber Daya Alam Jambi, Balai Taman Nasional Berbak, Dinas Kehutanan Kabupaten dan diperkuat oleh kelompok *masyarakat (community support ranger)*. Kelompok ini telah ditingkatkan kapasitasnya dalam patroli hutan dengan menerapkan Sistem SMART Patrol (*Spatial Monitoring Reporting Tools*) agar tercapainya patroli hutan yang efektif.

Lihat lampiran 7 ,8 dan 9 untuk detail pelaporan kegiatan ini.

Dalam periode ini juga telah berhasil dipasang pagar listrik bertenaga surya yang ramah bagi kelangsungan hidup harimau di kawasan Desa-desa Air Hitam Dalam sepanjang 1,5 kilometer dan di Rantau Rasau sepanjang 1,6 kilometer.



GAMBAR 7 Pemasangan pagar listrik efek kejut bertenaga surya yang ramah terhadap kelangsungan hidup harimau dan hewan pemangsanya serta manusia telah dipasang pada dua lokasi yang paling rawan terjadinya konflik manusia dengan harimau Sumatera di kawasan perbatasan Taman Nasional Berbak

Pemasangan ini bertujuan untuk sebagai alternatif model bagi masyarakat lokal dalam pemasangan pagar listrik bertegangan tinggi yang menyebabkan kematian harimau Sumatera guna menghindari kebun masyarakat dari gangguan hama satwa liar, khususnya babi hutan yang juga merupakan satwa buruan istimewa bagi harimau Sumatera. Alternatif pagar listrik hanya memberikan efek kejut dan tidak mematikan harimau Sumatera dan hewan mangsanya serta juga bagi manusia.

Dalam periode tahun ke-2, Satuan Tugas Persiapan Kelembagaan REDD+ (Satgas REDD+) dengan kepemimpinan Unit Kerja Presiden Bidang Pengawasan dan Pengendalian Pembangunan (UKP4) melalui pendanaan Kemitraan Iklim Indonesia – Norwegia telah mendukung diselesaikannya Dokumen Strategi dan Rencana Aksi REDD+ Provinsi Jambi Tahun 2012 – 2032. Dokumen ini telah direkognisi dengan Keputusan Gubernur Jambi No 352/ Kep.Gub/Setda Ekbang & SDA-4.2/2013 tentang Strategi dan Rencana Aksi REDD+ Provinsi (SRAP) 2012-2032. Lihat Lampiran 10 untuk melihat detail keputusan ini. SRAP REDD+ Provinsi Jambi merupakan penjabaran Strategi Nasional REDD+ yang telah direkognisi oleh Satuan Tugas REDD+ Indonesia yang sekarang dalam perkembangannya telah diubah oleh Keputusan Presiden No. 12 Tahun 2013 menjadi Badan Pengelola REDD+.

Dalam SRAP REDD+ tersebut Provinsi Jambi telah menetapkan Taman Nasional Berbak dengan kegiatan Pembasahan Kembali dan Konservasi Gambut sebagai salah satu prioritas tematik dan lokasi kegiatan REDD+ pada masa depan yang akan didanai oleh lembaga FREDDI (*Fund for REDD+ Indonesia*). Disamping itu, Provinsi Jambi oleh Satgas REDD+ telah terpilih menjadi salah satu provinsi percontohan prioritas dari 11 provinsi di Indonesia untuk pelaksanaan REDD+ dalam Kemitraan Iklim Indonesia – Norwegia fase kedua.

Pada periode tahun ke 2 pelaksanaan PRO Berbak, kegiatan persiapan dan pengujian insentif positif REDD+ telah memperoleh dukungan pendanaan baru dari Tropical Forest Conservation Action (TFCA)-Sumatera untuk melaksanakan komponen-komponen program pengurangan emisi karbon berbasis lahan yang mencakup :

- a. Legislasi Pengelolaan Lahan dan Kawasan Hutan Berkelanjutan
- b. Restorasi Habitat Harimau Terdegradasi
- c. Perlindungan, Pemantauan dan Penegakan Hukum
- d. Pembangunan Ekonomi Masyarakat Berkelanjutan

BAB 3 :

Tantangan implementasi dan rencana prioritas tahun ke-3

1. Tantangan Implementasi

Upaya dan berbagai pendekatan konservasi 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 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, atau pasar karbon akhirnya akan memberi imbalan atas upaya nasional, daerah dan lokal, termasuk di Taman Nasional Berbak berdasarkan hasil kinerja yang diraih dalam menurunkan emisi karbonnya.

Mencapai tujuan REDD+ di Taman Nasional Berbak 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 publik yang lebih luas dan komunitas hutan. REDD+ adalah menyangkut perubahan ekonomi hutan melalui insentif baru untuk melestarikan layanan ekosistem yang penting secara global, yaitu karbon hutan dan juga mengenai mengubah politik hutan dengan mengakui hak-hak dan norma-norma baru dalam pengambilan keputusan pengelolaan hutan. 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 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+ di Taman Nasional Berbak, 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. Cara baru dalam bekerjasama lintas sektor, kelompok pemangku kepentingan, dan tingkat pemerintah dibutuhkan untuk merancang program dan

Tidak kalah pentingnya adalah tantangan yang dihadapi guna mempersiapkan dan implementasi REDD+ di Taman Nasional Berbak, 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 keuangan 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 3

Pada tahun ke-3 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. Melanjutkan 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 pengujian insentif REDD+ pada masyarakat lokal.
6. Membagi pengalaman hasil pembelajaran kepada para pihak terkait penyusunan kebijakan REDD+ pada tingkat nasional, regional dan internasional.
7. Menyelesaikan Project Design Document REDD+ Lansekap Berbak.
8. Melanjutkan pencarian dan penggalangan potensi sumber-sumber pendanaan baru terkait dengan kelanjutan penyiapan dan pelaksanaan implementasi penuh REDD+ di Taman Nasional Berbak dan di Kawasan Penyangga Taman Nasional.

LAMPIRAN 1.



Report to Department for Food and Rural Affairs

Progressing REDD+ as a sustainable funding mechanism for tiger conservation

By : Mandar Trivedi , Laura Darcy and Erwin A Perbatakusuma

August 2013

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Progressing REDD+ as a sustainable funding mechanism for tiger conservation.

Mandar Trivedi , Laura Darcy and Erwin A Perbatakusuma

The following report describes the achievements of ZSL's Berbak Carbon Initiative (BCI) during the period July 2012 to June 2013, funded by the UK Department for Food and Rural Affairs (Defra). This work built on the firm base developed by the Darwin Initiative-funded 'Berkak to the Future' project (2009-2012).

Background

The Berbak peat swamp forest contains exceptionally high levels of carbon, which is currently being lost through fires, illegal logging and drainage canals. It also contains thriving populations of Sumatran tiger, Asian tapir, sun bear, clouded leopard, false gharial, Nordmann's greenshank and many other endangered species (Fig. 1). It is a RAMSAR site of international importance and one of Sumatra's last remaining intact peat swamp forests, delivering ecosystem services (e.g. hydrological regulation, food such as fish) that are vital to sustainable development among the neighbouring 32 villages (population: c.60,000).

During its initial Darwin-funded phase, the BCI established the feasibility of a REDD+ project by assessing the importance of the site for carbon storage, biodiversity conservation and community development. It also began the process of engaging potential investors and donors interested in investing in a future REDD+ demonstration project across the Berbak landscape. Two critical steps were required in order to progress the development of the REDD+ project and were the focus of this Defra-funded follow-up work:

- 1) **Securing government support** as a key enabling condition for project development and investment.
- 2) **Designing the REDD+ project**, including community engagement, in order to encourage investment.



Figure 1. Camera trap photos of Sumatran tiger (*Panthera tigris sumatrae*) and sun bear (*Helarctos malayanus*) in Berbak.

With the complexity of the political structures governing the development of REDD+ in Indonesia, it is vital for any nascent REDD+ project to be well 'embedded' in the domestic policy process through continual engagement with relevant policymakers and authorities. With regard to the second aspect of the work, a project design is needed, based on a sound understanding of the pressures, impacts and potential responses (project interventions) to reduce greenhouse gas emissions. This design can be shared with potential investors in order to secure the £8m needed to run a REDD+ demonstration project over the next 4-5 years.

Securing government support as a key enabling condition for project development and investment

Political engagement is being led by the project manager, funded by the Defra grant, Mr Erwin Perbatakusuma. Pak Erwin has a long background in conservation in Indonesia and has worked on numerous projects involving government partners.

Government approval for Berbak. Through ZSL and the National Park Authority's joint efforts, Berbak National Park has been approved by the Ministry of Forestry as one of only twenty REDD+ Demonstration Activity sites for Indonesia. In the National Park's buffer zone (where threats are greatest), ZSL has worked with the Jambi Regional Forestry Office to include additional forest areas as part of the REDD+ Demonstration Activity site. Letters of agreement have been secured to include the neighbouring Grand Forest Park and Protection Forest. Plans have now been agreed by the Governor of Jambi, as well as the district governments, to submit to the Ministry of Forestry a joint 'forest management unit' for the protected areas (*KPH*) as well as support to establish a Production Forest Management Unit (*KPHP*) for the adjacent logging concessions. These forest management units will allow for the entire peat dome to be managed as a single ecosystem, in line with Government of Indonesia guidelines.



Figure 2. Discussions with local government, led by Pak Erwin (left)

Support to policy/governance process. The Defra grant has enabled ZSL to provide expert support and technical advice to the Jambi government's efforts to develop REDD+ plans and improve governance. ZSL is a member of the Jambi REDD+ Commission and two of ZSL's staff led the writing of the Jambi REDD+ Strategy and Action Plan (SRAP) (2012–2032), which has found support from a multi-stakeholder dialogue process and been approved by a Governor's Decree. Jambi province was the first province to complete its SRAP. As a result, Jambi has been selected as a REDD+ Pilot Province for Indonesia by the Presidential REDD+ Task Force. Berbak/Muaro Jambi District is one of the priority sites to implement pilot REDD+ activities in the future. Also as a result of the Governor's Decree, the Chairman of the Presidential REDD+ Task Force has signed a Memorandum of Understanding with the Governor of Jambi concerning the policing of forest utilization permits.

Designing the REDD+ project, including community engagement, in order to encourage investment

Project design work is being led by a new member of staff, funded by the Defra grant, Dr Mandar Trivedi. Mandar has worked on REDD+ at an international level since the UNFCCC CoP13 in Bali, Indonesia, in 2007. With funding from Defra and co-funding from other donors, the Berbak REDD+ project is being designed in a way that addresses the threats to the peat swamp forest (and hence the long term delivery of ecosystem services vital for local development). The three key threats are: unsustainable and illegal logging, unsustainable drainage by canals, and wildfires. Agricultural encroachment is a secondary issue, since: (i) tropical peatlands are not well-suited to agriculture without high levels of investment, e.g. in drainage; and

(ii) the Berbak peat swamp forest landscape has been zoned as four forest classes: a national park, a provincial conservation area, a protection forest and a timber production forest. Interventions to deal with threats are being designed to be equitable, efficient and cost-effective. ZSL's expertise in 'conservation technology', such as camera traps and remote sensing will be drawn upon to develop relatively low-cost but robust monitoring systems so that the success of the project can be monitored and evaluated.

Community engagement. ZSL's work has found that, in common with other forest areas, pressures such as illegal logging, drainage canals and wildfires are driven by local choices within the context of a limited set of options for sustainable local economic development as well as a wider political economic context (i.e. political decentralisation, weak governance of natural resources and a high level of national economic growth). Hence, ZSL has taken an approach of engaging with the 32 neighbouring villages as well as District and Provincial governments, to understand the local context and receive their inputs into the design process. This engagement work, led by ZSL staff hired using Defra funds has included establishing a Free, Prior and Informed Consent (FPIC) process, working through a local community development NGO, Gita Buana (Fig. 3). This work was co-funded by a US\$57,000 grant to Gita Buana, secured by ZSL from the Clinton Climate Initiative of the Clinton Foundation.



Figure 3. Community engagement workshop on forests, climate change and REDD+, led by local NGO Gita Buana

Industry engagement. Sustainable Forest Management (SFM) is a key part of Indonesia's REDD+ strategy and it has potential in the Berbak landscape. Two timber concession operators have recently been granted timber licenses by the Ministry of Forestry within two concessions totalling almost 60,000 ha. Through working with the Jambi Regional Forestry Office, ZSL has engaged the two timber operators (Putra Duta Indahweeo and Pesona Belantara Persada) in a dialogue on how to shift current poor practices towards SFM. They have a high level of interest since improved forest management techniques and reduced illegal logging in their concessions are likely to increase their profits while reducing their operational risks.

Project design with expert input. Building on the Darwin-funded work, ZSL has begun to design the REDD+ project with input from a number of international and national experts. This includes building collaborations with researchers at the London School of Economics, University of Leicester, King's College London, University of Greifswald, University of Jambi and two consultancies: Deltares and Euroconsult Mott Macdonald. These groups have expertise in the assessment of deforestation, carbon, biodiversity, wildfires, hydrology and agroforestry – all necessary for the project design. Progress has been solid, but the design process cannot be completed until three things are in place: (i) further funding to commission vital assessments and scoping studies; (ii) the Indonesian Government has established the national REDD+ institutions which will set the rules for national REDD+ Demonstration Activities; and (iii) international standards (e.g. VCS and CCBA) and guidelines (e.g. IPCC) are established (likely within the next year).

Donor engagement. The project design process undertaken so far has provided us with sufficient information to submit funding proposals to source a £8m investment. Donors which have expressed interest in the project and have entered into discussions over the last year include: Norway (Norad Forest and Climate programme), Germany (International Climate Initiative); Indonesia-Norway Climate Partnership Fund (managed by UN-REDD); USA (USAID and the Millennium Challenge Corporation); and

Althelia (a Luxembourg-based EUR60m private climate fund). However, the lead times for these donor investments are long, which is causing a delay in moving the project forward. In addition, Norwegian funding pledged to Indonesian REDD+ activities is held up because Indonesia has not yet established the national REDD+ institutions which are required under the Norway-Indonesia agreement. A grant of US\$500,000 has been secured from the Tropical Forest Conservation Action (a debt-for-nature swap mechanism) of the US Government, which is focusing on tiger habitat protection and restoration in Berbak National Park, including the piloting of sustainable livelihoods activities. This 3 - year grant (2013-2016) will contribute to the design and testing process of the REDD+ demonstration project.

Summary and next steps

In summary, Defra's funding has enabled ZSL to hire staff to take forward two key elements of the REDD+ project development process: political engagement and project design. Donors, such as the German, Norwegian and US governments have shown much interest in this work and there is potential for a £8m investment to be secured in the coming year, if ZSL and our partners can continue to maintain the momentum that has been built. ZSL is currently seeking project funds of the order of £200,000 in order to complete the design process and secure a large-scale investment. A number of philanthropic foundations and government donors have been approached. ZSL hopes that the strong support that the UK Government has generously given to this project will continue during this next critical stage of the process towards full-scale REDD+ implementation.

LAMPIRAN 2



PEMERINTAH PROVINSI JAMBI DINAS KEHUTANAN

Jl. Arief Rachman Hakim No. 10 Telp. 0741 - 62295 Fax. 0741 - 61545
J A M B I

Kode Pos. 36124

Jambi, 17 April 2013

Nomor : 311 /BHK-43/IV/2013
Lampiran :
Perihal : **Persetujuan Lokasi *Demonstration Activities*
Reducing Emission from Deforestation and Forest Degradation
(DA-REDD+) di Taman Hutan Raya Sekitar Tanjung**

Kepada
Sdr. Program Manajer
Inisiatif Karbon Berbak
Zoological Society of London
Di Jambi

Dengan hormat,

Menindaklanjuti surat Saudara No 81/A/ZSL/II/2013 beserta lampiran proposal tertanggal 17 Februari 2013 mengenai Proposal Persetujuan Lokasi DA REDD+ di Taman Hutan Raya (Tahura) Sekitar Tanjung dan memperhatikan presentasi proposal Saudara pada tanggal 25 Februari 2013, dengan ini kami sampaikan sebagai berikut :

1. Memperhatikan Peraturan Pemerintah Nomor 38 Tahun 2007 tentang Pembagian Urusan Pemerintahan Antara Pemerintah, Pemerintahan Daerah Provinsi Dan Pemerintahan Daerah Kabupaten/Kota pada lampiran AA Pembagian Urusan Pemerintah Bidang Kehutanan, Sub-bidang 30 diatur bahwa kewenangan Pemerintah Daerah provinsi dalam Pengelolaan Taman Hutan Raya, diantaranya mengurus pemberian perizinan usaha pemanfaatan, termasuk pemanfaatan jasa lingkungan di Taman Hutan Raya skala provinsi;
2. Merujuk Peraturan Pemerintah No. 28 Tahun 2011 tentang Pengelolaan Kawasan Suaka Alam dan Kawasan Pelestarian Alam pada Paragraf 5 (Pasal 36), bahwa Taman Hutan Raya dapat dimanfaatkan untuk kegiatan penyimpanan dan/atau penyerapan karbon. Seterusnya pada Paragraf 7 (Pasal 38, Ayat 2), bahwa izin pemanfaatan Taman Hutan Raya dapat dilakukan setelah memperoleh izin dari gubernur/bupati/walikota sesuai dengan kewenangannya atau pejabat yang ditunjuk;
3. Berdasarkan Pasal 1 Peraturan Menteri Kehutanan Nomor : P. 20/Menhut-II/2012 tentang Penyelenggaraan Karbon Hutan, diatur bahwa kegiatan penyimpanan (stok) karbon, penyerapan karbon, penurunan emisi karbon hutan dan atau REDD+ (*Reducing Emission from Deforestation and Forest Degradation*) merupakan

penyelenggaraan karbon hutan. Seterusnya dalam Pasal 3 Peraturan Menteri tersebut, diatur bahwa :

- 3.1 Penyelenggaraan karbon hutan meliputi : a). Demonstration activities (DA). Demonstration activities adalah kegiatan pengujian dan pengembangan metodologis, teknologi dan institusi pengelolaan karbon hutan dalam rangka fase *readiness* (persiapan); b). Implementasi (pelaksanaan) kegiatan karbon hutan.
 - 3.2 Kegiatan karbon hutan dapat berupa penyimpanan dan/atau penyerapan karbon, diantaranya terdiri atas: a). Perlindungan keanekaragaman hayati; b). Pengelolaan hutan konservasi;
 - 3.3 Penyelenggaraan karbon hutan dapat dilaksanakan pada Hutan Negara yang mempunyai salah satu fungsinyasebagai hutan konservasi dan/atau Kawasan Pelestarian Alam, termasuk Kawasan Taman Hutan Raya.
4. Kegiatan REDD+ di Taman Hutan Raya Sekitar Tanjung dinilai layak dilaksanakan (*eligible*) dengan pertimbangan-pertimbangan sebagai berikut :
- 4.1 Tahura Sekitar Tanjung mengandung cadangan karbon sebesar ~3,377,990 ton dengan emisi karbon~ 12,397,223 ton CO₂e;
 - 4.2 Potensi ekonomi dari penjualan kredit dari pengurangan emisi tersertifikasi (*Certified Emission Reduction*) hutan di Tahura Sekitar Tanjung diperkirakan mencapai USD 229.847.838 atau setara dengan Rp. 2 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 229.847.838 lebih besar dibandingkan dengan tipe Proyek Pencegahan Mosaik Deforestasi dan Degradasi Tidak Terencana yang hanya bernilai USD 4.,455.014. Nilai ekonomi diharapkan mampu membiayai pengelolaan kawasan Tahura Sekitar Tanjung secara mandiri di masa depan.
 - 4.3 Kawasan Tahura Sekitar Tanjung memiliki tingkat laju deforestasi mencapai minus 3,03% pertahun. Diprediksi tanpa dilakukan upaya konservasi kawasan melalui skema REDD+, tutupan hutannya akan menyusut hilang pada tahun 2037. Pada tahun 2037 diprediksi kawasan Tahura Sekitar Tanjung akan kehilangan tutupan hutan seluas 4.760 hektar;
 - 4.4 Total emisi bersih karbon hutan yang akan dihasilkan 30 tahun kedepan tanpa adanya intervensi Proyek REDD atau kondisi *Business as Usual (BAU)* adalah 47,929,749 ton CO₂e. Jumlah nilai emisi ini bersumber dari pengeringan hutan gambut menempati porsi lebih besar dengan nilai 46,377,382 ton CO₂e. dan berasal dari deforestasi tidak terencana sebesar 1.552.367 ton CO₂e;

4.5 Ada 2 (dua) tipe proyek REDD+ yang berpotensi besar untuk diterapkan sesuai dengan *Voluntary Carbon Standard (VCS)* untuk mengurangi tingkat emisi karbon hutan dari deforestasi dan degradasi hutan di Tahura Sekitar Tanjung, yaitu :

- a) Pembasahan Kembali dan Konservasi Gambut (*Peat Rewetting and Conservation, PRC*). Tipe proyek ini sangat diutamakan, karena akan memangkas emisi karbon sangat besar setara dengan nilai 46.377.382 ton CO₂e atau 96,8 % terhadap jumlah total emisi karbon hutan yang dihasilkan Tahura Sekitar Tanjung sebesar 47.929.749 ton CO₂e dalam kurun waktu 30 tahun.
- b) Pencegahan Mosaik Deforestasi dan Degradasi Tidak Terencana (*Avoiding Unplanned Mosaic Deforestation and Degradation, AUMDD*). Tipe Proyek REDD+ akan mengurangi emisi karbon senilai 1.552.367 ton CO₂e atau 3,2 % terhadap jumlah total emisi karbon hutan yang dihasilkan Tahura Sekitar Tanjung sebesar 47.929.749 ton CO₂e dalam jangka waktu 30 tahun.

5. Berdasarkan ketentuan butir 1, butir 2, 3 dan butir 4, maka diberitahukan hal-hal sebagai berikut :

5.1 Kami menyetujui permohonan Saudara untuk melakukan kegiatan persiapan dan pelaksanaan *Demonstration Activities (DA) Reducing Emission from Deforestation and Forest Degradation (REDD Plus)* di Kawasan Taman Hutan Raya Sekitar Tanjung seluas 20.830 (*Dua Puluh Ribu Delapan Ratus Ribu*) hektar yang terletak Kabupaten Muaro Jambi dan Kabupaten Tanjung Jabung Timur Provinsi Jambi dan memasukan lokasi Tahura Sekitar Tanjung kedalam penyusunan Rancangan Desain Proyek (*Project Design Document*) REDD+ di Ekosistem Berbak yang disusun oleh Zoological Society of London dengan ketentuan-ketentuan sebagai berikut:

- a) Pelaksanaan DA-REDD+ difasilitasi dukungan pendanaan yang bersumber dari anggaran Pemerintah Daerah Provinsi. ZSL Indonesia akan pro aktif mendorong tersedianya dana hibah internasional dan/atau insentif positif yang diberikan lembaga donor internasional berbasis hasil kinerja (*performance-based*) dalam upaya REDD+ di Tahura Sekitar Tanjung.
- b) Pelaksanaan DA REDD+ merupakan fase persiapan untuk menuju fase pelaksanaan penuh REDD+ dan/atau penyelenggaraan karbon hutan dengan kegiatan-kegiatan persiapan sebagai berikut :
 - 1) Uji coba proses pembuatan atau penyempurnaan standar teknis pengukuran dan metodologi serta implementasi standar pengukuran karbon hutan, baik di atas permukaan tanah dan di bawah permukaan tanah;

- 2) Pendampingan untuk peningkatan kapasitas sumberdaya manusia dalam membangun standar pengukuran karbon hutan dan pengembangan sistim MRV (*Monitoring, Reporting dan Verification*);
- 3) Uji coba pengukuran dan modeling hidrologi gambut serta perbaikan sistem hidrologi di Hutan Gambut;
- 4) Peningkatan koleksi spesies keanekaragaman hayati untuk mendukung kegiatan budidaya;
- 5) Konservasi keanekaragaman hayati dan upaya peningkatan populasi spesies yang terancam punah, khususnya spesies harimau Sumatera dan satwa pemangsanya, spesies buaya serta jenis satwa burung;
- 6) Perlindungan ekosistem gambut dari bahaya kebakaran, pencegahan perambahan hutan, penebangan kayu liar serta perburuan satwa liar yang dilindungi, khususnya harimau Sumatera;
- 7) Pencegahan pengeringan hutan rawa gambut dari pembangunan kanal ilegal;
- 8) Pembentukan Unit Pengelolaan Teknis Daerah (UPTD) Tahura Sekitar Tanjung;
- 9) Penyusunan Dokumen Rencana Pemolaan Jangka Panjang, Jangka Menengah dan Jangka Pendek Tahura;
- 10) Penyusunan Dokumen Zonasi Pengelolaan Tahura Sekitar Tanjung;
- 11) Rehabilitasi kawasan hutan terdegradasi melalui penanaman kembali jenis-jenis pohon asli yang tepat ekologis dan sosiologis;
- 12) Pelibatan masyarakat lokal dalam kegiatan REDD+, khususnya proses PADIATAPA (*Persetujuan Atas Dasar Informasi Awal Tanpa Paksaan*) dan/ atau FPIC (*Free, Prior, Informed, Consent*);
- 13) Pelibatan masyarakat lokal dan sektor swasta dalam pengelolaan kolaboratif Taman Hutan Raya sebagaimana Peraturan Menteri Kehutanan Nomor 49 /P.19/Menhut-II/2004 tentang Kolaborasi Pengelolaan Kawasan Suaka Alam dan Kawasan Pelestarian Alam;
- 14) Peningkatan sumber pendapatan ekonomi alternatif ramah lingkungan dan/atau insentif positif konservasi bagi masyarakat lokal yang tergantung dari sumber daya hutan;
- 15) Pengembangan kelembagaan dan mekanisme distribusi REDD+ untuk Tahura Sekitar Tanjung.

5.2 Pelaksanaan DA REDD+ dapat ditingkatkan ke arah implementasi Ijin Penyelenggaraan Karbon (perdagangan karbon) atau pemanfaatan jasa lingkungan karbon, apabila pasar karbon, baik dengan mekanisme wajib (*compliance*) maupun sukarela (*voluntary*), yang bersedia membeli kredit penurunan emisi tersertifikasi (*certified emission reduction*) sebagai hasil dari upaya konservasi, perbaikan dan pemulihan ekosistem hutan gambut di Taman Hutan Raya Sekitar Tanjung;

5.3 Ketentuan mengenai Ijin Penyelenggaraan Karbon dan Tata Cara Pemanfaatan Jasa Lingkungan Karbon akan merujuk pada Peraturan Menteri Kehutanan tersendiri.

Demikian disampaikan untuk menjadi perhatian dan dipedomani oleh Saudara dalam persetujuan pemanfaatan kawasan Taman Hutan Raya Sekitar Tanjung sebagai lokasi dan wilayah kerja REDD+.

Atas perhatian Saudara diucapkan terima kasih.

**KEPALA DINAS KEHUTANAN
PROVINSI JAMBI**



Ir. IRMANSYAH RACHMAN
Pembina Utama Madya
NIP. 1961041519899031005

Tembusan disampaikan kepada Yth:

1. Gubernur Jambi sebagai laporan
2. Direktur Jenderal Perlindungan Hutan dan Konservasi Alam, Kementerian Kehutanan di Jakarta.
3. Ketua Kelompok Kerja Perubahan Iklim Kementerian Kehutanan di Jakarta.
4. Direktur Pemanfaatan Jasa Lingkungan Kawasan Konservasi dan Hutan Lindung, Ditjen PHKA, Kementerian Kehutanan, di Bogor.
5. Laura D'Arcy, Country Manager Zoological Society of London Indonesia di Bogor
6. Komisi Daerah REDD+ Provinsi Jambi di Jambi.

LAMPIRAN 3.



MENTERI KEHUTANAN
REPUBLIK INDONESIA

KEPUTUSAN MENTERI KEHUTANAN REPUBLIK INDONESIA

Nomor : SK. 549/Menhut-II/2013

TENTANG

PERSETUJUAN PENYELENGGARAAN *DEMONSTRATION ACTIVITIES REDUCING EMISSION FROM DEFORESTRATION AND DEGRADATION* (DA REDD+) PADA TAMAN NASIONAL BERBAK SELUAS 142.750 (SERATUS EMPAT PULUH DUA RIBU TUJUH RATUS LIMA PULUH) HEKTAR

MENTERI KEHUTANAN REPUBLIK INDONESIA,

- Menimbang :
- a. bahwa berdasarkan surat Nomor S.258/BTNB-1/2012 tanggal 21 Juni 2012, Kepala Balai Taman Nasional Berbak mengajukan permohonan Penyelenggaraan *Demonstration Activities Reducing Emission From Deforestation And Degradation* (DA REDD+) pada Taman Nasional Berbak, seluas 142.750 (seratus empat puluh dua ribu tujuh ratus lima puluh) hektar kepada Menteri Kehutanan;
 - b. bahwa Balai Taman Nasional Berbak telah melengkapi persyaratan permohonan Penyelenggaraan DA REDD+ sesuai Pasal 4 ayat (2) Peraturan Menteri Kehutanan Nomor P.20/Menhut-II/2012 tentang Penyelenggaraan Karbon Hutan, dengan melampirkan proposal rancangan DA REDD+, dokumen perjanjian kerjasama dengan mitra kerja dan rencana pengelolaan dan penataan zonasi Taman Nasional Berbak;
 - c. bahwa Direktur Jenderal Perlindungan Hutan dan Konservasi Alam setelah berkoordinasi dengan Ketua Kelompok Kerja Perubahan Iklim Kementerian Kehutanan telah melakukan penilaian permohonan penyelenggaraan DA REDD+ yang diajukan oleh Kepala Balai Taman Nasional Berbak;
 - d. bahwa berdasarkan pertimbangan sebagaimana huruf a, huruf b dan huruf c di atas, perlu menetapkan Keputusan Menteri Kehutanan tentang Persetujuan Penyelenggaraan *Demonstration Activities Reducing Emission From Deforestation And Degradation* (DA REDD+) Pada Taman Nasional Berbak Seluas 142.750 (seratus empat puluh dua ribu tujuh ratus lima puluh) hektar;

Mengingat.....

- Mengingat : 1. Undang-Undang Nomor 5 Tahun 1990 tentang Konservasi Sumber Daya Alam Hayati dan Ekosistemnya;
2. Undang-Undang Nomor 41 Tahun 1999 tentang Kehutanan, sebagaimana telah diubah dengan Undang-Undang Nomor 19 Tahun 2004;
3. Undang-Undang Nomor 32 Tahun 2009 tentang Perlindungan dan Pengelolaan Lingkungan Hidup;
4. Undang-Undang Nomor 17 Tahun 2004 tentang Pengesahan *Kyoto Protocol To The United Nations Framework Convention on Climate Change*;
5. Peraturan Pemerintah Nomor 28 Tahun 2011 tentang Pengelolaan Kawasan Suaka Alam dan Kawasan Pelestarian Alam;
6. Peraturan Presiden Nomor 24 Tahun 2010 tentang Kedudukan, Tugas, dan Fungsi Kementerian Negara serta Susunan Organisasi, Tugas, dan Fungsi Eselon I Kementerian Negara;
7. Keputusan Presiden Nomor 84/P Tahun 2009 tentang Pembentukan Kabinet Indonesia Bersatu II sebagaimana telah diubah dengan Keputusan Presiden Nomor 59/P Tahun 2011;
8. Peraturan Menteri Kehutanan Nomor P.40/Menhut-II/2010 tentang Organisasi dan Tata Kerja Kementerian Kehutanan sebagaimana telah diubah dengan Peraturan Menteri Kehutanan Nomor P.33/Menhut-II/2012;
9. Peraturan Menteri Kehutanan Nomor P.20/Menhut-II/2012 tentang Penyelenggaraan Karbon Hutan;

MEMUTUSKAN :

Menetapkan : **KEPUTUSAN MENTERI KEHUTANAN TENTANG PERSETUJUAN PENYELENGGARAAN DEMONSTRATION ACTIVITIES REDUCING EMISSION FROM DEFORESTRATION AND DEGRADATION (DA REDD+) PADA TAMAN NASIONAL BERBAK SELUAS 142.750 (SERATUS EMPAT PULUH DUA RIBU TUJUH RATUS LIMA PULUH) HEKTAR.**

KESATU : Memberikan persetujuan penyelenggaraan *Demonstration Activities Reducing Emission From Deforestation And Degradation* yang selanjutnya disebut DA REDD+ kepada Balai Taman Nasional Berbak sebagai pemrakarsa DA REDD+ yang meliputi Kabupaten Muaro Jambi dan Kabupaten Tanjung Jabung Timur di Taman Nasional Berbak, sebagaimana peta terlampir.

KEDUA.....

- KEDUA : Pembiayaan dan pelaksanaan kegiatan DA REDD+ di Taman Nasional Berbak dilakukan oleh pemrakarsa DA REDD+ bersama ZSL (*Zoological Society of London*) Indonesia sebagai mitra dengan perjanjian kerjasama.
- KETIGA : Kegiatan-kegiatan DA REDD+ yang dapat dilakukan berkaitan dengan:
- a. Uji coba/proses pembuatan atau penyempurnaan standar teknis pengukuran/metodologi dan implementasi standar pengukuran karbon di kawasan konservasi.
 - b. Pada uji coba pembuatan atau penyempurnaan standar teknis pengukuran/metodologi sebagaimana huruf a, agar menetapkan stock karbon hutan di Taman Nasional/Kawasan Konservasi sesuai amanat *Bali Action Plan* artikel 1.b.iii (REDD+), dilakukan sebagai upaya penyempurnaan standar global yang ada;
 - c. Melakukan pengembangan validasi dan MRV, kuantifikasi nilai marka dasar emisi, stock karbon hutan di Taman Nasional/Kawasan Konservasi dan laju perubahan dalam skenario bisnis;
 - d. Konservasi keanekaragaman hayati dan upaya peningkatan populasi spicies terancam punah;
 - e. Perlindungan ekosistem gambut dari bahaya kebakaran dan illegal logging;
 - f. Peningkatan sosial ekonomi masyarakat sekitar dan pengembangan kelembagaan pengelola DA REDD+;
 - g. Pendampingan untuk proses pembuatan atau penyempurnaan standart teknis pengukuran.
- KEEMPAT : Pemrakarsa DA REDD+ bersama mitranya dalam pelaksanaan kegiatan DA REDD+ wajib:
- a. melakukan pelaksanaan DA REDD+ sesuai dengan kriteria DA;
 - b. membangun jaringan pengaman tata kelola (*governance*), sosial, budaya dan biodeversitas;
 - c. menjaga kawasan dari peningkatan degradasi dan deforestasi kawasan serta memelihara stok dan serapan karbon;
 - d. melakukan koordinasi dan meminta arahan kepada instansi berwenang dalam membuat rencana distribusi insentif sesuai ketentuan, sebagai bahan untuk diajukan kepada instansi berwenang;
 - e. melaksanakan kegiatan secara nyata di lapangan dalam waktu 90 (sembilan puluh) hari sejak persetujuan DA REDD+ diberikan;
- KELIMA : Persetujuan penyelenggaraan DA REDD+ tidak akan merubah peruntukan dan fungsi kawasan pelestarian alam yang bersangkutan.

KEENAM.....

- KEENAM** : Pemrakarsa melaporkan hasil kegiatan DA REDD+ setiap akhir tahun kepada Menteri Kehutanan & Direktur Jenderal PHKA, kelompok Kerja Perubahan Iklim Kementerian Kehutanan dan tembusan kepada Sekretaris Jenderal, paling lambat diterima pada tanggal 20 Desember dari tahun berjalan.
- KETUJUH** : Apabila pemrakarsa DA REDD+ tidak melaksanakan ketentuan-ketentuan sebagaimana dimaksud dalam keputusan ini, maka persetujuan penyelenggaraan DA REDD+ sebagaimana keputusan ini dibatalkan.
- KEDELAPAN** : Persetujuan penyelenggaraan DA REDD+ berlaku untuk jangka waktu 5 (lima) tahun dan dapat diperpanjang setelah kegiatannya dievaluasi oleh Ditjen PHKA.
- KESEMBILAN** : Keputusan ini mulai berlaku pada tanggal ditetapkan.

Ditetapkan di Jakarta
pada tanggal 31 Juli 2013

Salinan sesuai dengan aslinya,
KEPALA BIRO HUKUM DAN ORGANISASI,



**MENTERI KEHUTANAN
REPUBLIK INDONESIA,**

ttd

ZULKIFLI HASAN

Salinan Keputusan ini disampaikan kepada:

1. Pejabat Eselon I lingkup Kementerian Kehutanan.
2. Ketua Kelompok Kerja Perubahan Iklim Kementerian Kehutanan.
3. Kepala Pusat Litbang Kebijakan dan Perubahan Iklim.
4. Direktur Pemanfaatan Jasa Lingkungan Kawasan Konservasi dan Hutan Lindung, Ditjen PHKA.
5. Kepala Balai Taman Nasional Berbak.
6. Kepala ZSL Indonesia Program.

LAMPIRAN 4

Camera trapping for mammals at the ZSL Berbak Carbon Initiative in Sumatra, Indonesia.

Murray Collins, Laura Darcy, Karen Jeffers, Citra Novalina, Dolly Priatna, Erwin Perbatakusuma, Waluyo Sugit and other ZSL field team members.

Abstract

We describe the results of camera trapping at Berbak National Park in Jambi province, Sumatra, and surrounding concessions and protection forest (hereafter collectively called the ZSL Berbak Carbon Initiative; BCI). We phototrapped for a total of 7183 days, over a period of 4 years, at 121 different camera trap locations. These total figures comprised three separate surveys: 1) a rapid assessment at the beginning of the project to determine presence of mammals; 2) A survey in a grid format to attempt to assess differences in capture rates between different habitat types at the site; and 3) a subsequent tiger monitoring programme. In total, we captured a total of 965 independent events during the entire period, recording 29 mammal, 8 bird and 1 reptile species.

Here we provide a mammal list for the park, and then focus on the critically endangered Sumatran tiger (*Panthera tigris sumatrae*) and its potential prey species. Furthermore we take particular interest in the differences in capture rates between the different habitat types at the site, in order to contribute to answering a broader question about the relationships between deforestation and degradation and biodiversity conservation at the site. Using forest definitions from the supervised classification of satellite (SPOT V) imagery, we clustered the camera trap sites into primary, secondary and swamp bush habitat. More broadly still the results of these first surveys provide crucial information on the status of tigers and their prey at a key tiger conservation unit. The Lack of such data has historically hampered tiger conservation throughout Asia. his contribution is the first stage in filling a gap in knowledge of the tiger's distribution in this part of coastal Sumatra.

Crude photograph rates for all species (number of trapping days per animal photographed) for all three surveys were highest in the primary forest at 6.1; declined to 8 in secondary forest, and fell further to 10.6 in swamp bush habitat. However, these global figures mask taxa-specific differences. For all surveys, rates for tigers were 18 times higher in secondary forest (40 days/photograph), than in primary forest (720 days/photograph). A potential source of bias is introduced through use of data from the rapid survey and tiger monitoring programmes (surveys 1 and 2 above), since these cameras were placed purposively at sites that tigers were known to use, in easily accessible locations near rivers, which were equally more likely to be in secondary forest. We therefore re-ran the analysis on the data from the camera grid survey only, during which cameras were more evenly distributed across habitat types (in fact were more heavily focussed on primary forest). Whilst the difference in trapping rates between primary and secondary forest were less stark, they were nonetheless still large. Photograph rates were 8 times higher in secondary (rate =82) than primary (rate = 667) forest (no tigers were recorded in swamp bush during the grid sampling). We used relationships published in the literature to estimate tiger density at the site. Using data from all surveys, but excluding one outlier (Parit 14-1) we estimate tiger density to be 0.2 tigers/km² in primary forest, 2.4 tigers/100km² in secondary forest and 0.6 tigers/100km² in swamp bush. Multiplying these densities by the area of each habitat at BCI predicts an estimated tiger population size of 22 individuals. We have already identified 15 individuals from at the site (two now recorded deceased) despite not having trapped across the entire BCI area. So predicted population size based on trapping rates of unidentified individuals (i.e. events only) is largely in accordance with our attempts to identify individuals based upon stripe markings at the site.

Introduction

Camera traps have become an indispensable tool for the assessment of cryptic species living in dense tropical rainforest (Carbone et al., 2001; O'Brien et al., 2003, Ahumada et al., 2011,

Wibisono et al., 2011). Here we describe the results of the first ever camera trapping surveys of Berbak National Park, in Sumatra, Indonesia. Peat Swamp Forest (PSF) as found at BCI has historically been less intensely studied than forests on mineral soils, partly because they were once written off as biologically impoverished ecosystems. However the the level of biodiversity which they support has become more of interest recently, particularly in the context of climate change mitigation in our focal country, Indonesia. Here, efforts to reduce emissions from deforestation and degradation (REDD+) have a focus on carbon-rich peatland (Paoli et al., 2010). Whilst Paoli et al. suggest that on average PSF is indeed less diverse and supports fewer threatened species than mineral soil forests in Indonesia, there is nonetheless an urgent need for conservation of and research in this ecosystems since a) as above they are a core part of Indonesia's REDD+ programme and so likely to receive additional conservation funding that needs to be spent wisely; b) little is known about many PSF sites and so generalisations from data from few sites may be unfounded; and c) PSF is in some areas the only remaining standing forest, and is therefore a crucial refuge for many species that might otherwise prefer dryland mineral soil forests. In this latter context, it is noteworthy that Berbak is a priority I tiger conservation unit (TCU) and is a crucial part of a highly fragmented network of protected areas across Jambi province.

Methods

I Survey site

The BCI study site is an area of predominantly peat swamp forest in eastern Sumatra. Berbak's forests are managed under legislation specific to different land classifications including:

1. Berbak National Park under the control of central government in Jakarta;
2. Protection forest under the control of Jambi provincial government;
3. Hutan tahura, also managed by the provincial government;
4. Production forest managed by a timber concessionaire.

BCI is a pilot REDD+ pilot project co-managed by the Zoological Society of London (ZSL) and the Government of Indonesia, and funded for three years by the UK government's Darwin initiative.

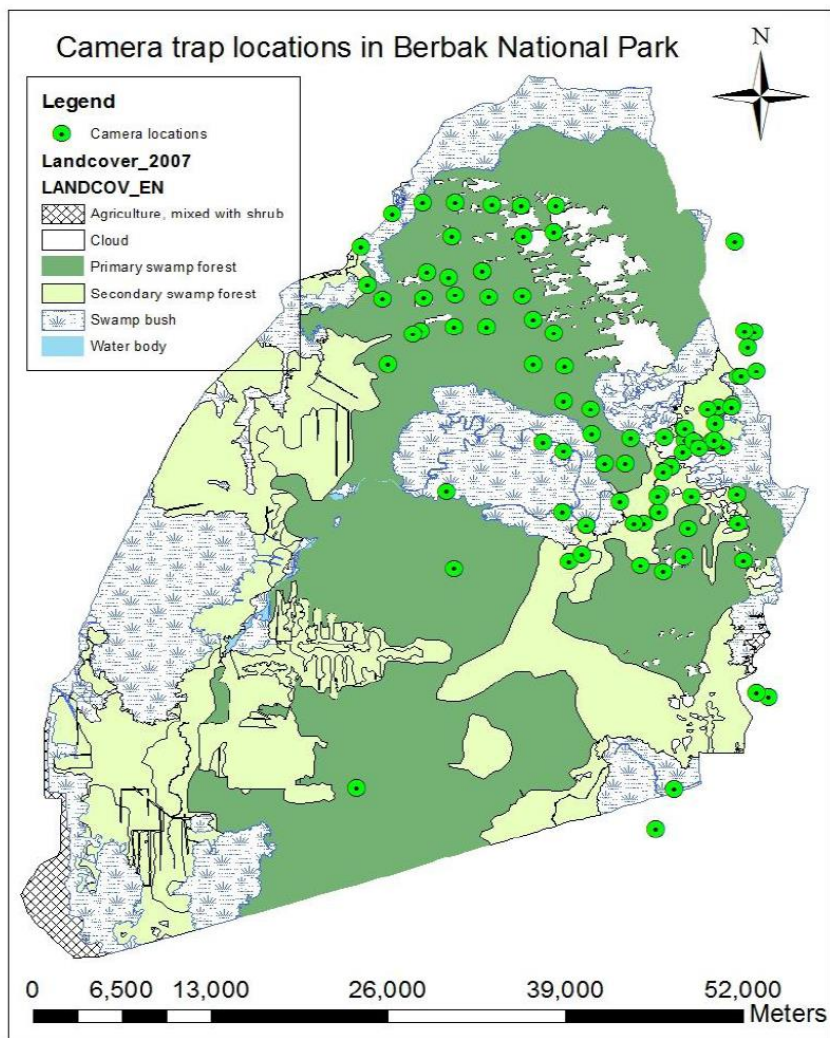
ii Camera trapping

Camera traps have been placed by ZSL in Berbak National Park since 2007 and have been deployed in three phases. The first phase was a rapid assessment survey designed to test for the presence of mammals, particularly the Sumatran tiger. A second survey was started in 2009 using a grid approach stratified across different habitat types (habitat was classified using an existing supervised habitat classification from remote sensing data (SPOT V)). There were two grids of cameras: The first was designed to sample primary forest, whilst the second was designed to cover secondary forest and swamp bush, the other two major habitat types classified at the site (see Figure 1). During the third phase of camera trapping, the tiger monitoring stage, cameras were purposively placed to get photographs of tigers, at sites with large amounts of tiger sign, or where they had been repeatedly photographed in the first two surveys.

In summary, during the entire period discussed here, there were 44 camera placements in primary forest for a total of 2160 days; 64 camera placements in secondary forest for 4474 days; and 12 placements in swamp bush for 549 days. Broken down by survey phase: 1. during the first, rapid assessment, survey there were 5 camera placements in primary forest for a total of 92 days, 22 in secondary forest for a total of 618 days, and 2 in swamp bush for a total of 88 days. In the second, grid-based survey, there were 34 placements in primary forest for a total of 2002 days; 17 in the secondary forest for a total of 1480 days; and 5 placements in swamp bush for a total of 206 days. During the third, tiger monitoring, survey, there were 5 placements in primary forest a total of 66 days, 25 placements in secondary forest for total of 236 days, and 5 placements in swamp bush for a total of 2648 days. The location of all of the camera placements over the entire period are set out on the map of the BCI project area in Figure 1 below.

ADDITIONAL INFORMATION ON TYPES AND MODELS used]. Units were placed in steel cages to protect against both animal damage and theft. All units were placed to preferentially capture medium-large sized mammals, with a focus on taking photographs of tigers and their prey.

Figure 1.0 Habitat types and camera trap locations at Berbak National Park.



Results

We removed all duplicate images where sequential photographs of the same species were recorded within 5 minutes of one another. After this process 965 individual events remained for the entire period across all three surveys. We captured a total of 29 mammal, 8 bird and one species of reptile (summarised in table 1.1). Six species (*Prionodon linsan*, *Arctictis binturong*, *Prionailurus planiceps*, *Leopoldamys sabanus*, *Hystrix bracyura*, and *Cynogale bennettii*) were only ever captured once, whilst the most abundant species were the Greater mouse deer (*Tragulus napu*) captured 287 times, pig-tailed macaques (*Macaca nemestrina*; 209 times) and wild pig (*Sus scrofa*, 179 times).

Mean number of species captured at each camera placement was 2.7 species in primary forest; also 2.7 in the secondary forest ; but fell to 1.6 in the swamp bush locations. Photographic rates (PR) for all species recorded (number of trapping days per animal photographed) for all three surveys were highest in the primary forest at 6.1; declined to 8 in secondary forest, and fell further

to 10.6 in swamp bush habitat. However, these global figures mask taxa-specific differences in the trapping rates.

The critically endangered Sumatran tiger (*Panthera tigris sumatrae*) was recorded in 117 individual events (notably 42 of these events were recorded at only one site known as Parit-14) Overall, the PR for tigers were 18 times higher in secondary forest (40 days/photograph), than in primary forest (720 days/photograph). However wild pig (*Sus scrofa*), a key tiger prey species, was trapped at fairly equal rates across habitat types (PR= 39 in primary forest; PR=41 in secondary; PR=36 in swamp bush).

Given the very large difference in PR between the primary and secondary forest for tigers, we were concerned that there was potential bias introduced by using the data from the rapid survey and tiger monitoring programmes (surveys 1 and 2 above), since these cameras were placed purposively at sites that tigers were known to use, in easily accessible locations near rivers, which were equally more likely to be in secondary forest. In particular, this process removed the likely outlier site Parit-14 from the analysis, at which site 42 tiger events were recorded comprising 6 individual animals (see figure 1.2 for location). For comparison, at 100 camera locations we never captured a tiger at all, and the mean number of photographs at the remaining 21 sites that did record tigers was 5.6. We therefore then re-ran the analysis on the data from the camera grids only (survey 2; summarised in table 1.2). During this survey cameras were more distributed across habitat types (in fact were more heavily focussed on primary forest). However, the broad pattern for tigers still held, with trapping rates being 8 times higher in secondary (rate =82) than primary (rate = 667) forest (no tigers were recorded in swamp bush during the grid sampling).

The Parit 14-1 site is particularly interesting since the literature suggests that proximity to human disturbance and hunting are highly influential in determining tiger occupancy (Linkie et al., 2004; O'Brien et al., 2003), and yet this site is close of all our trap sites to human settlement on the coast. With relatively few tiger detection points across the site (limited to camera trap studies due to the nature of the inundated/boggy PSF substrate; but notwithstanding the possibility of using scent mark detection as a means for repeat detection/non-detection in such conditions (H.Wibisono, pers.comm)) it is difficult to establish meaningful statistical relationships across the site between tiger occupancy and variables such as proximity to human settlement, or prey abundance, a key predictor of tiger abundance (Karanth et al., 2004). Furthermore we do not anticipate having captured every animal in the population since our sampling efforts have been limited to largely to the north and the east of the park (due to a combination of logistical and administrative issues surrounding access to the concessions adjoining the protected areas). It is difficult to make a density assessment using mark-recapture since our data is distributed over a number of years, during different surveys with different numbers of cameras and therefore different sampling areas, and with different numbers of tigers captured during each period¹.

One option that is available to us is to use broad scale statistical relationships between phototrapping rates and tiger density which have been published in the literature (Carbone et al., 2001). This approach has been contested and is acknowledged by the authors as being less robust than using mark-recapture (Carbone et al., 2001, 2002). Yet given the current data, we feel it is the best available option. Moreover the approach has been used in the literature as part of tiger population assessments in Kerinci Seblat National Park, Sumatra (Linkie et al., 2006). Specifically Carbone et al., (2001) estimated that the relationship between tiger density (y) and phototrapping rates (x) was:

$$y = 133.89x^{-0.971} \quad (\text{eq. 1})$$

First we used this equation on the data from all surveys. However, we draw readers'

¹ A planned camera trapping exercise using 100 cameras simultaneously across the site should be able to provide a dataset more suited for the assessment of tiger density at the site.

attention to the site called Parit 14-1 which recorded 41 events of 6 individual tigers. We are concerned that this site biases the data set, and so we also provide an analysis with this site removed, and then finally based on the grid survey only. We calculated the area of each landcover type from the SPOTV landcover classification, and multiplied the estimated density given by the equation above by the area of the respective landclass to get an estimate for the tiger population. For all surveys, we estimated 0.2 tigers/100km² in primary forest, 3.7 tigers/100km² in secondary forest and 0.6 tigers/km² in swamp bush. This gave a total estimated population of 2, 26 and 3 tigers in primary, secondary and swamp bush habitat respectively, a total population of 31 animals. Of course these are averaged figures and we are not stating that individual tigers have exclusive territories in particular habitat types.

For all surveys, except Parit 14-1 we estimate a density of 0.2, 2.4 and 0.6 tigers/100km² in primary forest, secondary forest and swamp bush respectively. This corresponds to a total population estimate of 22 individuals, based on on 117 events.

For the grid survey only, we estimate 0.2 and 1.9 tigers/100km² in primary and secondary forest respectively (with no tigers recorded in swamp bush). This corresponds to a total population estimate of 15 individuals. All results are summarised in table 1.3.

These figures, based upon the phototrapping rate only (i.e. encounters with unidentified individuals) are largely in accordance with our attempts to identify individuals based on stripe patterns and other identifying marks. From this latter approach we believe we have recorded a total of 15 different tigers over the entire survey period (8 males, 5 has been females, 1 unknown; see table 1.4).

Table 1.1 Summary of species caught in camera traps at the Berbak Carbon Initiative, 2007-2012.

Long-tailed Macaque	<i>Macaca fascicularis</i>	34	211	108	320	NA
Long-tailed Porcupine	<i>Trichys fasciculata</i>	7	1026	309	NA	NA
Mongoose-Short-tailed	<i>Herpestes brachyura</i>	12	599	432	639	NA
Moonrat	<i>E. g. candidus</i>	0	NA	NA	NA	NA
Otter Civet	<i>Cynogale bennettii</i>	1	7183	2160	NA	NA
Pig-tailed Macaque	<i>Macaca nemestrina</i>	209	34	20	54	31
Porcupine	<i>Hystrix bracyura</i>	1	7183	NA	4474	NA
Red Spiny Rat	<i>Maxomys surifer</i>	3	2394	2160	2237	NA
Sambar Deer	<i>Cervus unicolor</i>	2	3592	NA	2237	NA
Shrew-faced Squirrel	<i>Rhinosciurus laticaudatus</i>	3	2394	720	NA	NA
Sun Bear	<i>Helarctos malayanus</i>	15	479	360	559	549
malayan tapir	<i>Tapirus indicus</i>	63	114	2160	75	275
Sumatran Tiger	<i>Panthera tigris sumatrae</i>	117	61	720	40	275
Wild Pig	<i>Sus scrofa</i>	179	40	39	41	37
Yellow-throated Marten	<i>Martes flavigula</i>	2	3592	2160	NA	549

Table 1.2 Photographic rates from the grid survey only.

Species	Latin name	Number of events	Overall photographic rate (number of trapping days/animal photograph).	Photographic rate: Primary forest	Photographic rate: Secondary forest	Photographic rate: Swamp bush
Banded Linsang	<i>Prionodon linsang</i>	1	3764	2002	NA	NA
Banded Palm Civet	<i>Hemigalus derbyanus</i>	1	3764	NA	NA	282
Bear cat / Binturong	<i>Arctictis binturong</i>	1	3764	NA	1480	NA
Bearded Pig	<i>Sus barbatus</i>	6	627	2002	296	NA
Clouded Leopard	<i>Neofelis diardi</i>	2	1882	1001	NA	NA
Common Palm Civet	<i>Hemigalus derbyanus</i>	0	NA	NA	NA	NA
Flat-headed Cat	<i>Prionailurus planiceps</i>	1	3764	2002	NA	NA
Greater Mouse Deer	<i>Tragulus napu</i>	156	24	15	114	24
Leopard Cat	<i>Prionailurus bengalensis</i>	4	941	501	NA	NA
Lesser Mouse Deer	<i>Tragulus javanicus</i>	0	NA	NA	NA	NA
Long-tailed Giant Rat	<i>Leopoldamys sabanus</i>	0	NA	NA	NA	NA
Long-tailed Macaque	<i>Macaca fascicularis</i>	21	179	100	1480	NA
Long-tailed Porcupine	<i>Trichys fasciculata</i>	7	538	286	NA	NA
Mongoose-Short-tailed	<i>Herpestes brachyura</i>	5	753	400	NA	NA
Moonrat	<i>E. g. candidus</i>	0	NA	NA	NA	NA
Otter Civet	<i>Cynogale bennettii</i>	1	3764	2002	NA	NA
Pig-tailed Macaque	<i>Macaca nemestrina</i>	142	27	19	64	24
Porcupine	<i>Hystrix bracyura</i>	1	3764	NA	1480	NA
Red Spiny Rat	<i>Maxomys surifer</i>	1	3764	2002	NA	NA
Sambar Deer	<i>Cervus unicolor</i>	0	NA	NA	NA	NA
Shrew-faced Squirrel	<i>Rhinosciurus laticaudatus</i>	3	1255	667	NA	NA
Sun Bear	<i>Helarctos malayanus</i>	7	538	400	1480	282
malayan tapir	<i>Tapirus indicus</i>	19	198	2002	82	NA
Sumatran Tiger	<i>Panthera tigris sumatrae</i>	21	179	667	82	NA
Wild Pig	<i>Sus scrofa</i>	112	34	38	33	20
Yellow-throated Marten	<i>Martes flavigula</i>	2	1882	2002	NA	282

Figure 1.2 Location of Parit 14-1.

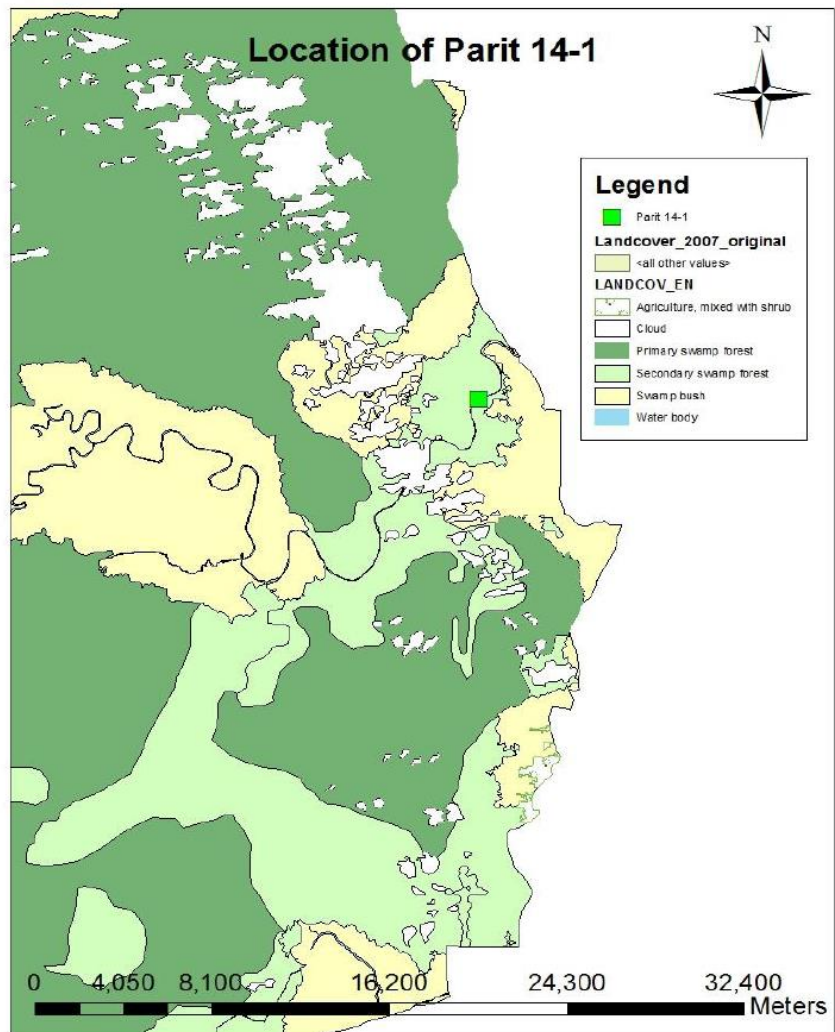


Table 1.3 Estimates of tiger density and population at BCI.

	Number of events	Overall photographic rate (number of trapping days/animal photograph).	Photographic rate: Primary forest	Photographic rate: Secondary forest	Photographic rate: Swamp bush	Overall density estimate	Primary density estimate/100km ²	Secondary density estimate / 100km ²	Swamp density estimate / 100km ²	Total estimated population individuals	Area primary forest 100km ²	Area secondary forest 100 km ²	Area swamp bush 100km ²
All surveys	117	61	720	40	275	2.5	0.2	3.7	0.6		10.1	6.9	5.6
Crude population estimate													
							2.3	25.6	3.2	31			
All surveys, except Part 14	75	96	720	64	275		0.2	2.4	0.6				
Crude population estimate													
							2.3	16.2	3.2	22			
Grids only	21	179	667	82	NA	0.9	0.2	1.9	NA				
Crude population estimate													
							2.5	12.7	NA	15			
Mean population estimate										23			

Table 1.4 Individual tigers captured on camera at BCI.

	Name	First Photographed	Locations	Habitat
1	JAMANTARA Male	January 2008	Simpang Kubu Simpang Gajah (Cell 8 Grid 1) Simpang Malaka_Simpang Platu Simpang Malaka (Cell 11 Grid 1) Parit 14-1	Secondary Primary Secondary (cloud) Secondary Secondary
2	LESTARI Female	January 2008	Rapid survey 2007 (X 427397 - Y 9815404) Simpang Kubu	Secondary Secondary
3	SATRIA Male	February 2008	Simpang Kubu Simpang Gajah Kiri Simpang Platu 3	Secondary Secondary Secondary (cloud)
4	PANDAWA Male	January 2009	Simpang Kubu Simpang Kubu (Cell 26 Grid 1) Sungai Jering 2 Parit 16 Awal Simpang Gajah kiri Parit 14-1 Simpang Platu 3 Simpang Gajah kiri 2 (cell 27_2009) Simpang Kubu 3 (Grid 1 Cell 32) Sungai jering 3 (X 431445 - Y 9845315)	Secondary Secondary Secondary Secondary Secondary Secondary Secondary (cloud) Secondary Secondary Secondary
5	SUSAN Female	November 2007	Simpang Raket Simpang Kubu (Cell 26 Grid 1) Simpang Gajah 1 Simpang Gajah Kiri	Secondary Secondary Secondary Primary forest
6	ADAM Male	Jan/Feb 2008	Sungai Benu	Sw amp bush/x-burnt
7	VICTORIA Female	February 2009	Simpang Kubu	Secondary
8	MAHADEWI (deceased) Female	December 2009	Parit 14-1 Simpang Malaka 5	Secondary Secondary
9	ISABELA Female	June 2010	Parit 14-1 Simpang Malaka 5	Secondary Secondary
10	KING ARTHUR (deceased) Male	June 2010	Parit 14-1	Secondary
11	JULIO Male	July 2010	Lubuk Bundar 2	Primary
12	KARTINI Female	July 2010	Simpang Kubu Simpang Gajah kiri	Secondary Secondary
13	RAJA BELANG Male	February 2011	Simpang Platu 3	Secondary (cloud)
14	MOGA Male	March 2012	Parit 14-1	Secondary
15	JANTINA Unknown sex	Date unclear	Sungai Jering 3 (X: 431459)	Secondary

Discussion

We have here described the results of the first ever camera trapping surveys in Berbak National Park and surrounding. The presence of a suite of Sundaland mammalian fauna emphasise the importance of the site for biodiversity conservation in an era of continuing deforestation and environmental degradation in one of the most biodiverse places on earth. Whilst our photographic rates for several smaller species are quite low (six species only ever being trapped once), this is likely the results of the field placement of cameras, which during each of the three surveys were positioned to preferentially capture medium-large mammals.

Specifically with regards tigers, our findings from Berbak seem to emphasise the importance of secondary forest for the Sumatran tiger. In theory also, we would expect to find this relationship. Secondary forest tends to have a more fragmented canopy than primary forest, allowing more light to reach the forest floor, which in turn associated with higher growth rates of under storey vegetation. This attracts higher densities of browsers which form the tiger prey base. Yet in our data we have not found higher densities of prey species in secondary forest. For instance greater mouse deer and wild pig were on the contrary captured more often in primary forest than either secondary or swamp bush vegetation. This causes us to reject the hypothesis that it is simply easier to photograph medium-large mammals in secondary forests. As such, there may be behavioural explanations for the apparent habitat preference of tigers, such as the proximity to water bodies and secondary forest, or the relative ease of hunting prey in secondary compared to primary forest. However we are wary of drawing broad and more substantive conclusions, since there are probably other factors involved which determine tiger distribution at the site such as distance from human disturbance and hunting, which has been shown to be a crucial factor determining tiger and prey abundance in Bukit Barisan NP in south Sumatra (O'Brien et al., 2003).

In terms of providing a population assessment, two independent measures of tiger population at the site (individual identification based on visible features like stripes), and application of a published formula relating trapping rates to density, point to a population between 15 and 22 individuals.

In a broader context, these results are of interest to the conservation implications of the implementation of REDD+ in Indonesia. Here there is a focus on primary forest, particularly carbon-rich peat swamp forests, to the detriment of less carbon rich but nonetheless biodiverse secondary forest, and mineral soil forests. Whilst any programme that provides additional support for Indonesia's forests is welcomed, as it currently stands the programme will neglect forests that provide what in this case appears to be the preferred habitat of Indonesia's last tigers.

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LAMPIRAN 5.

Bird and tree distribution modelling at the ZSL Berbak Carbon Initiative

Berbak National Park, Jambi Province, Sumatra

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Abstract

We discuss the results of bird surveys from the Berbak Carbon Initiative (BCI), a REDD+ pilot project managed by the Zoological Society of London (ZSL) in Jambi province, Sumatra, Indonesia. Our objective was to explore the ways in which different species are distributed across the Berbak landscape and to assess avian species richness in the different forest classes. We sampled 24 sites representing the different habitat types found at the site including primary and secondary peat swamp forest (PSF), mixed agriculture, beach/coastal mud flat and swamp bush. This latter habitat is a grassy swamp which grows after fire has destroyed forest. At each of the 24 points DR performed point count surveys for birds (one in early morning, one early evening). We recorded a total of 177 bird species, with 161 species being recorded in primary forest, 62 being recorded in secondary forest, 42 species in the swamp bush, and 51 species in the coastal environment.

Since it is not possible to sample everywhere, we used species distribution modelling (SDM) to predict habitat suitability for a selection of the observed species. We chose a selection of 40 species for which sufficient presence points were available and used the Maximum Entropy approach (Maxent), using predictor variables derived from SPOT V remote sensing imagery (Satellite Pour L'Observation de La Terre, V). From these species we assessed model performance and then examined the predicted habitat suitability maps for the better performing models. Where possible we compared the basic ecological knowledge of a species with the predictive models of the selected species. We focus here on 3 particular species for which we have ecological knowledge and which represent both ends of the spectrum of specialisation.

The highly generalist Crested myna (*Acridotheres cristatellus*), was predicted to have higher habitat preference to the areas outside the intact forest blocks whereas, conversely, the specialised Rhinoceros hornbill (*Buceros rhinoceros*) was predicted to find more suitable habitat in the remaining intact forest. Intriguingly, many of the models suggest an area of high importance for generalist birds is in an area of swamp bush/forest-edge matrix habitat in the south-west of the project area. Future surveys and further model development are planned to assess the true importance of these habitats for generalist species. However, despite this apparent importance for the modelled species, we continue to emphasise that the highest overall species richness was found in the intact primary forest areas.

Introduction

Deforestation in the tropics is a fundamental driver of biodiversity loss (Sodhi et al., REF). A great deal of hope for biodiversity conservation is therefore pinned on mechanisms which promise to stem this loss, in particular the REDD+ mechanism. Whilst positive relationships have been established between biodiversity and forest carbon on the widest scales (REF REF), trade-offs between carbon stores and biodiversity have been found on a

regional scale, particularly where the huge stores of carbon in PSF are involved (Paoli et al., 2011?). However, few studies on the relationship between carbon and biodiversity at the fine scale have been produced. These analyses are hampered by a lack of data, and so a crucial first step in attempting to explore approaches for conserving both carbon and biodiversity is to collect high-level data on how these values are distributed. Whilst the biodiversity conservation component of the BCI remit covers the analysis of a range of taxa, we chose birds for one of the first major surveys for the site since a) Berbak National Park (BNP) is an Important Bird Area, and b) birds are a useful taxon to monitor since they are quite well understood and readily identifiable using regional field guides even in remote areas such as Berbak. Birds can be efficiently surveyed using indirect methods (Stotz et al., 1996, Sutherland, 2006). Furthermore they display ecological congruence with other taxa in the tropics (Schultz et al., 2004), and so may represent broader measures of diversity that are, of course, also of interest to the project.

Many SDM techniques are available. Here we decided to use the maximum entropy approach (Maxent; Phillips et al., 2005; Phillips Dudik & Schapire 2006) since it performs well with relatively few presence points (Hernandez et al. 2006), and the fact that it is immune to the false absences (Elith et al., 2006) which were doubtlessly generated after having conducted only one field survey.

Technically, the Maxent approach involves software being trained through the use of presence points and a series of predictor variables derived from remote sensing data. Commonly these include climate variables e.g. CLIMOD. However, in our case, we are examining relationships on a much smaller scale, at which climatic variables are relatively homogenous. As such we rely here upon predictor variables derived solely from remote sensing data (*sensu* Lahoz-Montfort et al., 2010). The software uses presence-only locations and remote sensing variables to produce the distribution maps, which display the suitability of each map cell as a function of the values of the environmental variables of that cell (Saatchi et al., 2008). The final mapping products therefore show the least constrained (hence maximum entropy) predicted habitat suitability models for each species that still agree with the presence data. Bias in the data collection points can be mitigated by providing the software with a bias grid providing *a priori* probability of sampling in each each cell (Phillips, 2005).

Methods

i. Study site: ZSL Berbak Carbon Initiative

The BCI study site is an area of predominantly peat swamp forest in eastern Sumatra. Berbak's forests are managed under legislation specific to different land classifications including:

1. Berbak National Park under the control of central government in Jakarta;
2. Protection forest under the control of Jambi provincial government;
3. Hutan tahura, also managed by the provincial government;
4. Production forest managed by a timber concessionaire.

BCI is a pilot REDD+ pilot project co-managed by the Zoological Society of London (ZSL) and the Government of Indonesia, and funded for three years by the UK government's Darwin initiative.

ii. Field surveys

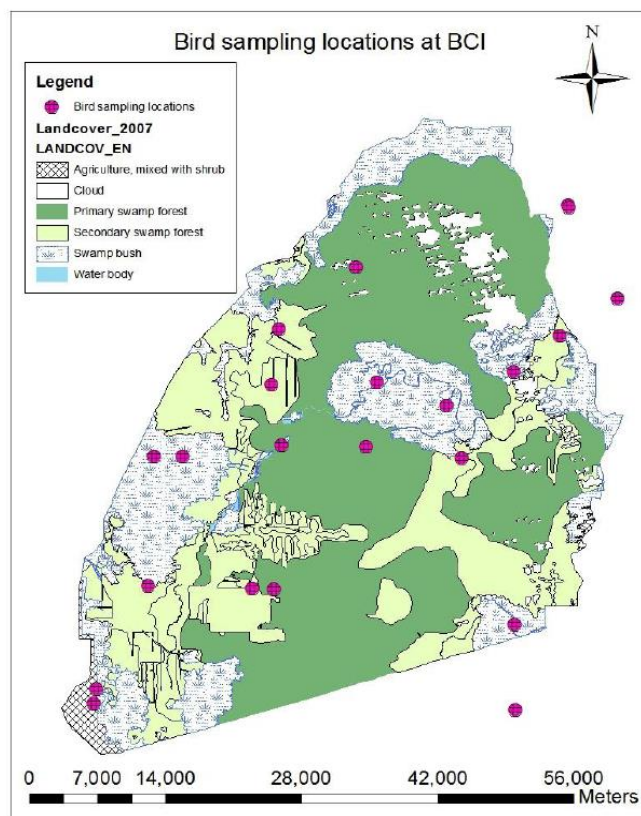
The field survey site selection was purposive, in order that surveys were performed in the full range of different habitats at the BCI site. To design the sampling approach, DP used a habitat map produced from the supervised classification of a high resolution satellite image (SPOT V; ZSL classification), and selected 24 approximate locations to be sampled. DR (an

highly experienced field researcher) then led field teams to the pre-selected locations. Upon arrival at the pre-selected locations, GPS coordinates were recorded using Garmin Csx?, along with the environmental conditions (habitat, weather) and timing. At each site, 5 sub-sites were selected 50 metres from a centre point in order to maximise the range of viewing conditions and micro-habitats present.

Point counts were performed twice at each site, once in the morning (07.00-10.00), and once in the afternoon (15.00-18.00). During each of these periods, 30 minutes were spent at each of the 5 sub-sites, the remainder of the time being spent moving from sub-site to sub-site. In order to reduce bias, surveys were not performed on days with inclement weather.

Each bird observed at the site, either visually or aurally, was recorded, . Identifications were confirmed using the Birdlife guide for the region (REF!). These observations gave us, in total, a month of data collected across a range of different habitats and micro-habitats, during homogenous climatic conditions.

Figure. 1. Bird sampling locations at BCI.



iii. Data analysis: Summary statistics and species distribution modelling

In order to analyse the data we used some elementary summary statistics to produce a bird list for the park and BCI. We also calculated bird species richness in the different land class types as derived from the initial ZSL SPOT V supervised classification. Whilst this baseline information is useful and contributes to the requirement of a fundamental Darwin project outcome (determine species richness across forest types), we wanted to improve the analysis in two ways:

First, we wanted to make use of species presence data points from across the site, and use these to take a predictive approach. This is because, despite continued deforestation in Jambi, BNP still retains a large amount of forest and swamp, and is remote and inaccessible. This makes it very expensive and logistically difficult to run surveys across the entire site. Furthermore, tiger conflict increases the hazard for crepuscular research activity. Second, we wanted to remove any subjectivity from the original supervised classification land cover assessment, and to take a more finer-scaled approach. That is, rather than saying solely that a given species X is more often found in habitat that we classified as primary forest, we wanted to know how (or whether) the presence of different species related to readily quantifiable predictor variables that we could derive for the entire BCI site from satellite imagery.

Ultimately, we used a list of 40 species for which more than 8 points were available. To assess model performance we used the area under the Receiver Operating Characteristic (ROC) curve (AUC; Philips 2005; Saatchi et al., 2008).

iii. Data analysis c) Remote sensing imagery

Our study is carried out on a small scale where variables often used in species distribution modelling (SDM) such as climatic variables (e.g. CLIMOND/Bioclim data set) are quite homogenous. Furthermore, other commonly used predictor variables such as slope and aspect built from digital elevation models are homogenous across the site, since the coastal swamps of Jambi are low-lying and flat. We confirmed this by examining a Shuttle Radar and Topography Mission (SRTM) dataset from NASA for the area (CIAT).

We found 1 case in the literature where small-scale species distribution modelling had been performed solely using remote sensing predictor variables, in particular the Lahoz-Montfort et al (2010) was influential. Following their approach, we searched for LANDSAT 7 images of the BCI area, which falls on the intersection between two paths of the satellite. LANDSAT 7 imagery is, unfortunately, degraded after a failure in 2003 of the scan line corrector instrument (SLC-off) which has resulted in large gaps in the images which need to be filled with data from other sources to make a gap-free composite. We examined the result of a gap-filled image for the site analysed by an analyst at the NGO BIOTROP, in which it was quite apparent that there had been gap filling, which in turn we felt would reduce the quality of any derived predictor variables.

We then turned to LANDSAT 5 imagery, which is freely available at the USGS Global Visualisation site (<http://glovis.usgs.gov/>). Whilst we found a relatively cloud-free image for the western side of our study area (125/61; level L1T) there was persistent cloud cover in all of the scenes for the littoral area at 124/61 (Level L1T). We radio-metrically corrected the scenes then performed a mosaic operating on bands 1, 2, 3, 4, 5 & 7. To make the corrections and derive variables we first calculated the LANDSAT 7 digital number equivalent for the LANDSAT 5 data using standard coefficients and then converted these to radiance and finally reflectance values, again using published coefficients (REF) and the metadata for the respective LANDSAT images stored in the metadata (REFS IN THE COLORADO STATE DOCS).

BOX 1.

Radiance L = (gain * DN7) + bias where L is the calculated radiance [in Watts / (sq. meter * π * ster)], DN7 is the Landsat 7 ETM+ DN data (or the equivalent calculated in step 2), and the gain and bias are band-specific numbers. The latest gain and bias numbers for the Landsat 7 ETM+ sensor are given in Chandler et al. (2009 REF COLORADO) and are shown in the following table.

Band	Gain	Bias
1	0.778740	-6.98
2	0.798819	-7.20
3	0.621654	-5.62
4	0.639764	-5.74
5	0.126220	-1.13
7	0.043898	-0.39

We then produced a series of derived predictor variables including Non-Differentiated Vegetation Index (NDVI), SAVI (which is similar to NDVI but attempts to correct for background soil conditions), greenness, brightness and wetness. These variables were produced using the following equations:

- ⤴ **Brightness**=(("band1radiance"*0.3561)+("band2radiance"*0.3972)+("Band3radiance"*0.3904)+("band4radiance"*0.6966)+("band5radiance"*0.2286)+("band7radiance"+0.1596)
- ⤴ **Greenness**=(("Band1radiance"*-0.3344)+("band2radiance"*-0.3544)+("Band3radiance"*-0.4556)+("band4radiance"*0.6966)+("band5radiance"*-0.0242)+("band7radiance"+-0.2630)
- ⤴ **Wetness**=(("Band1radiance"*0.2626)+("band2radiance"*0.2141)+("Band3radiance"*0.0926)+("band4radiance"*0.0656)+("band5radiance"*-0.7629)+("band7radiance"*-0.5388)
- ⤴ **NDVI**=(band 4 – band 3) / (band 4 + band 3)
- ⤴ **SAVI**=(1 + L)*(band 4 – band 3) / (band 4 + band 3 +L) where the Top Of Atmosphere reflectances are used for each band and L is a soil brightness correction factor. From Huete (1988), L=0.5 is used in most conditions.

However, despite choosing the least-poor quality scenes, we were not satisfied with the resulting products. Dissatisfied, we then turned to MODIS imagery (<http://glovis.usgs.gov/>), exploring variables which have been used successfully to model species distributions elsewhere such as Leaf Area Index (Saatchi et al2008). However, for our small-scale modelling purposes we felt that the resolution of these images was too low.

Finally we turned to images from the Satellite Pour L'Observation de La Terre, V (SPOTV). Whilst these images must be bought, land cover classification for carbon assessments and the demands of species distribution modelling were of such a high priority that two scenes from August 2007 were purchased which covered the entire BCI area. These very high resolution images (2.5*2.5m) had limited cloud cover, making them more readily suited to the present task of SDM. The scattered clouds were masked out using a supervised classification. We re-sampled the original raster images to 10*10m. From these pre-corrected images we derived a series of predictor variables following Cheng (REF, IN THE SAT FOLDER; BOX1.2). These variables were then converted into the .ascii format for entry into the Maxent software

Box 1.1: Variables and formulae	Index	Formula
1. difference vegetation index (DVI),	DWI	$NIR - SWIR$
2. ratio vegetation index (RVI; Jordan,),	RWI	$NIR / SWIR$
3. normalized difference vegetation index (NDVI),	NDWI	$\frac{NIR - SWIR}{NIR + SWIR}$
4. re-normalized difference vegetation index (RDVI)	RDWI	$\frac{NIR - SWIR}{\sqrt{NIR + SWIR}}$
5. soil adjusted vegetation index (SAVI)	SAWI	$\frac{(NIR - SWIR)(1 + L)}{NIR + SWIR + L}$, where $L = 0.5$
6. the second modified soil adjusted vegetation index (MSAVI2)	MSAWI2	$\frac{2NIR + 1 - \sqrt{(2NIR + 1)^2 - 8(NIR - SWIR)}}{2}$
7. infrared percentage vegetation index (IPVI)	IPWI	$\frac{NIR}{NIR + SWIR}$
8. modified simple ratio (MSR).	MWSR	$\frac{\frac{NIR}{SWIR} - 1}{\sqrt{\frac{NIR}{SWIR} + 1}}$
9. Non-Differentiated Vegetation Index NDVI		

^aNote the substitution of the SWIR band for the RED band (cf. Table 3).

Results

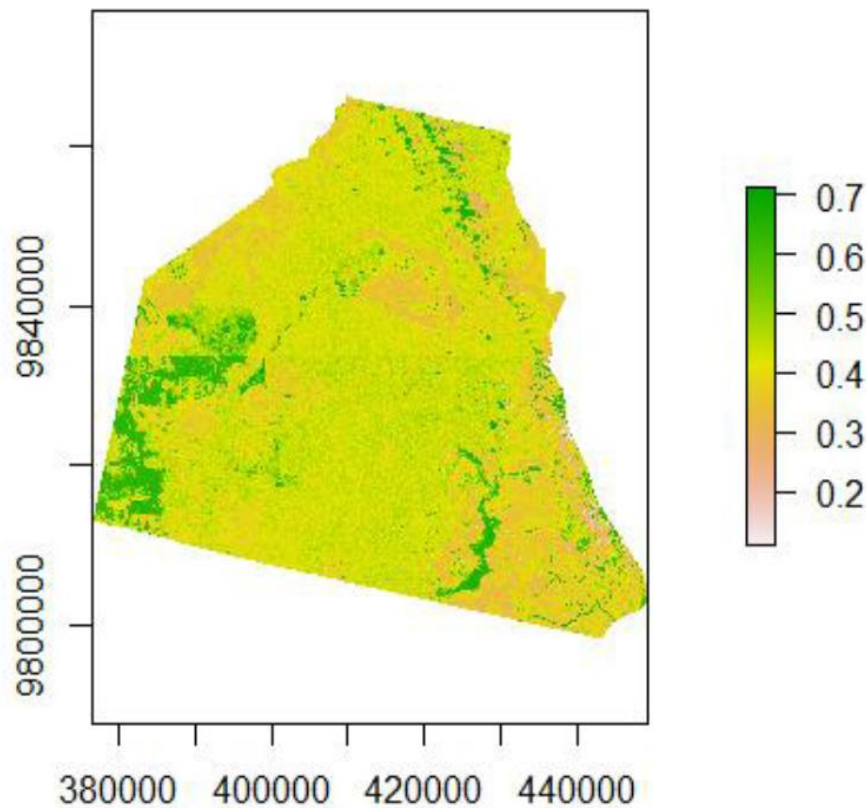
i. Summary statistics

We counted a total of 177 species in our survey. Based upon the habitat classification from the SPOT imagery, we found 161 bird species in the primary forest, 62 species in the secondary forest and 42 species in the swamp bush, whilst the beach surveys yielded 51 species.

ii. Maxent SDMs: composite species richness approach

We modelled a total of 40 species for which a sufficient number of presence points were available to run through Maxent. We then created a composite image of the mean of all modelled species, in order to attempt to create a species richness map for the area of interest (AOI), shown in figure 2.1 below. This map suggests that the area to the south-west of the AOI is the richest for bird species sampled. This area is a matrix of swamp bush, agriculture and secondary forest. The apparently high species richness in these sites reflects the fact that, from our limited ecological knowledge, a majority of the species that we modelled are a) habitat generalists or b) more easily observed in the more open areas that are subject to species-specific detectability biases. Due to these concerns, we decided to abandon this all-species richness assessment approach, and examine a selection of species models on an individual basis, with a more meaningful, narrower selection of species.

Figure 2.1 Predictions of habitat suitability probability from across the BCI, as derived from a composite of 40 Maxent models of bird species observed during surveys.

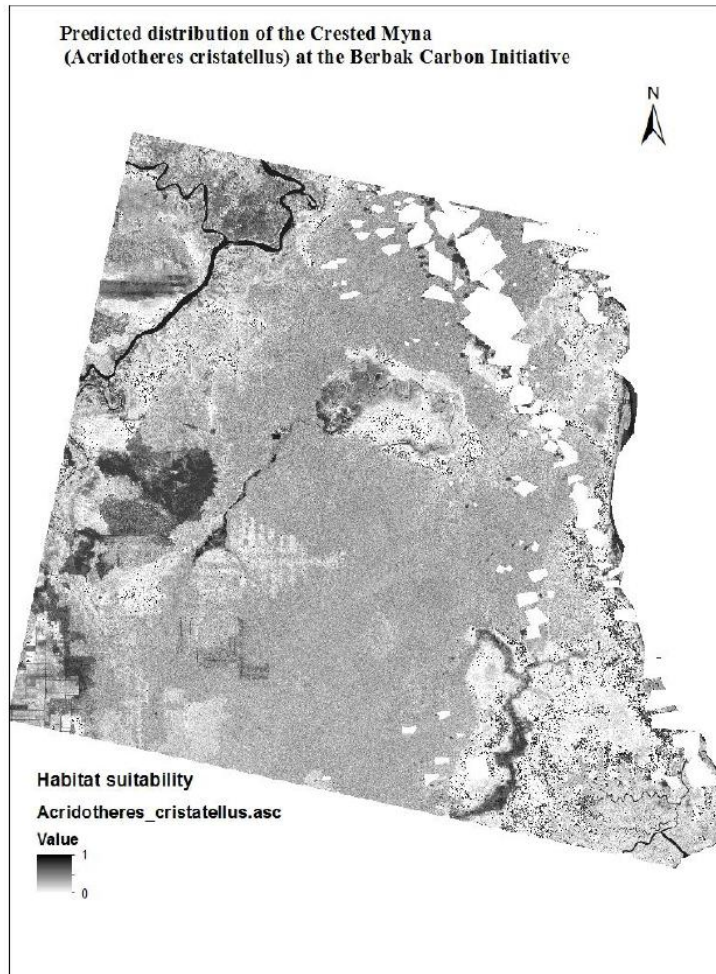


iii. Maxent SDMs: individual species distribution

Here we describe, on a model by model basis, the results from the modelling of 2 generalist species and a forest specialist species to test the ecological validity of our results.

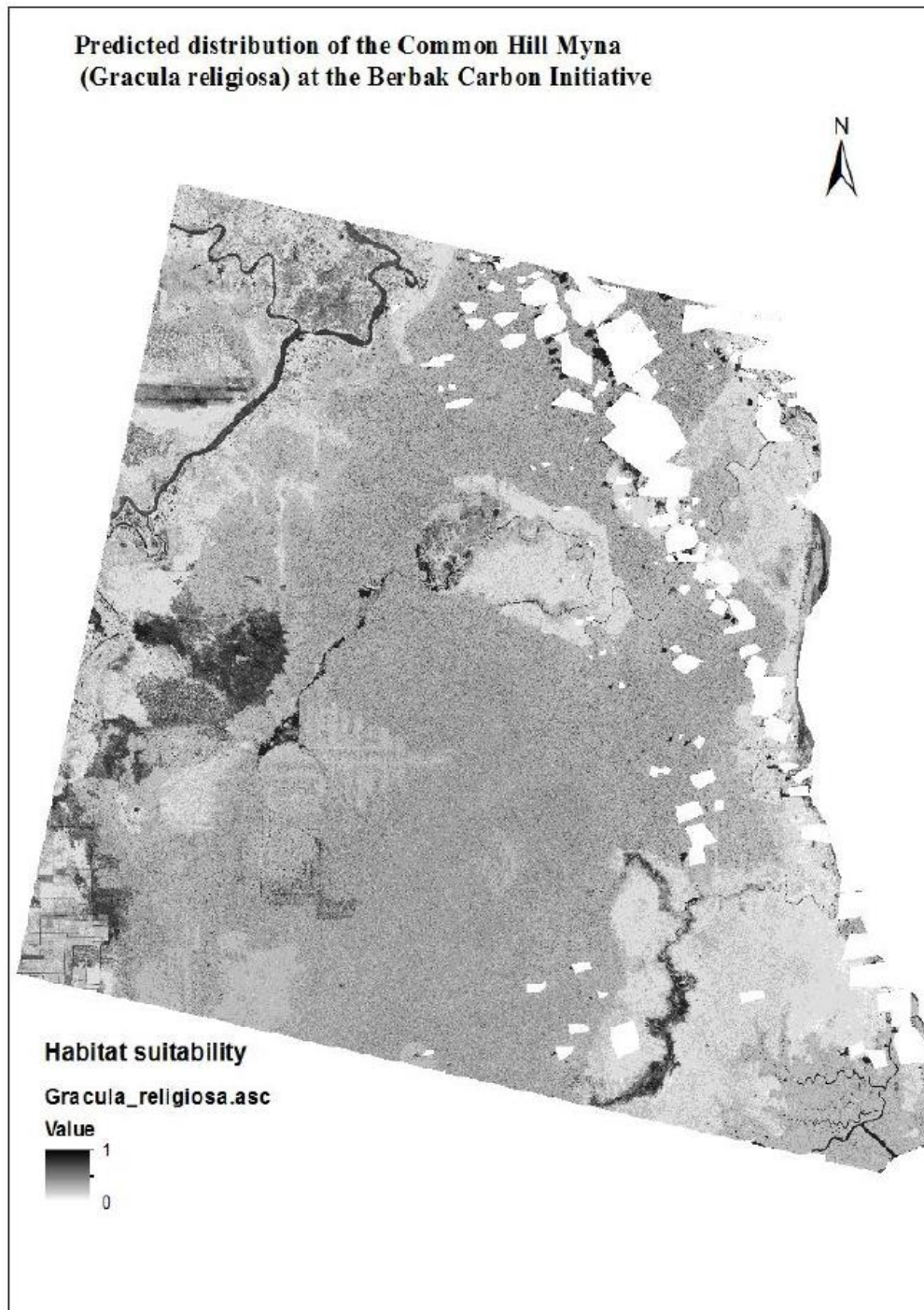
a) Crested Myna (*Acridotheres cristatellus*).

In terms of model performance, the AUC was 0.744, indicating a relatively good performance against a random performance of 0.5. The model indicates that the most suitable habitat for this species is the large open swamp bush/secondary forest matrix in the western part of the map below and, similarly, the large cleared area in the centre of the park which was burned in the fires of 1997. This fits with our ecological knowledge of the species which is described in the literature as a generalist which prefers forest edge and open areas. This also may explain the prediction of a strip of high suitability between the forest edge and the beginning of a patch of agricultural development in the south-west of the AOI.



b) Common hill Myna (Gracula religiosa)

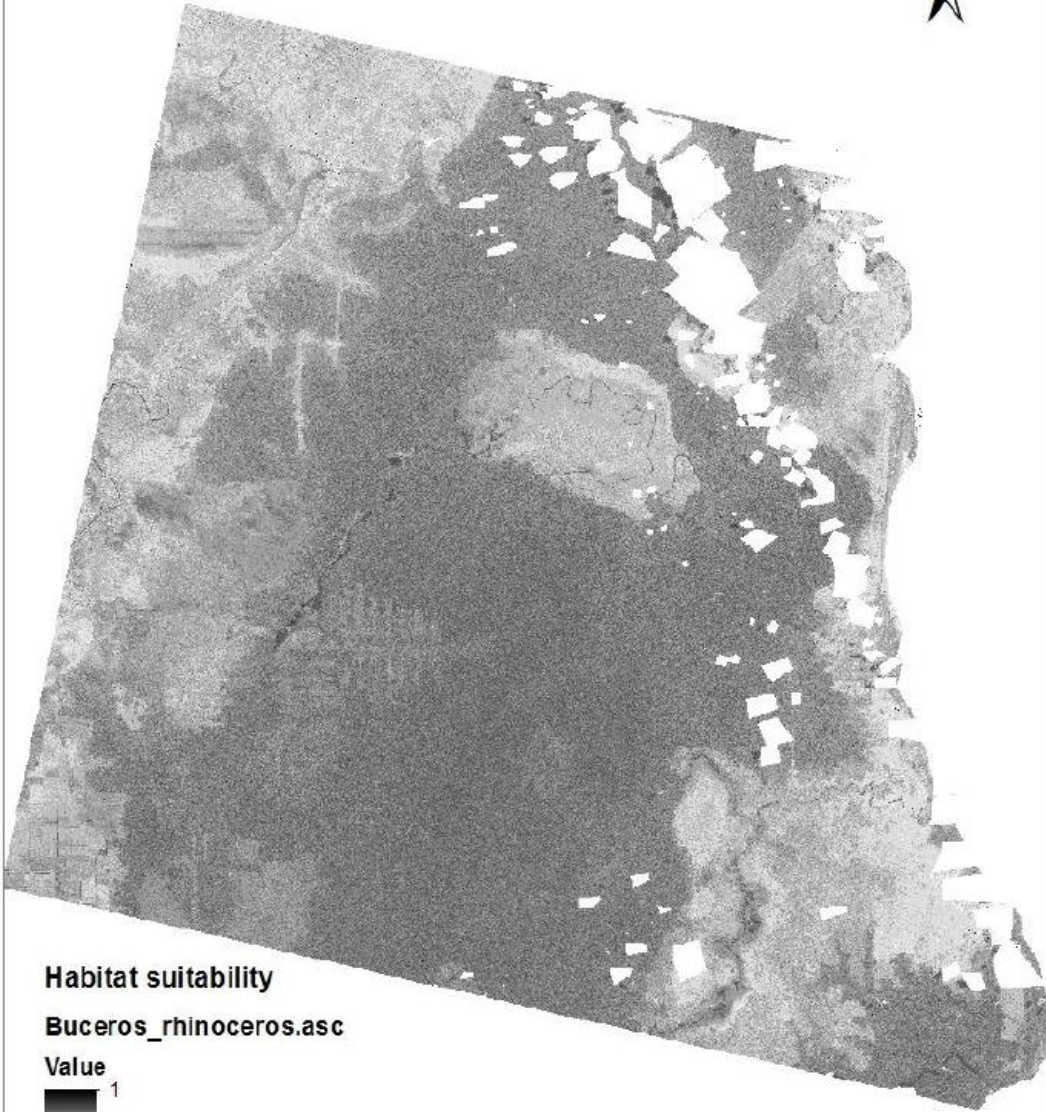
Similar to the performance of the previous model, the AUC for *Greligiosa*, another species of Myna, was 0.69. Equally, the predictions of the model were very similar to the areas on the forest periphery predicted to be of highest suitability for the species. This again fits with published ecological knowledge of the species, which is described as being a gregarious forest-edge species.



c) Rhinoceros hornbill (*Buceros rhinoceros*)

The model for the Rhinoceros hornbill performed nearly as well as the Crested Myna with an AUC value of 0.695. The species is predicted to be largely restricted to what we have classified as intact forest areas from the supervised classification of SPOT V imagery. Ecologically, this also makes sense in that hornbills require large mature trees in which to nest, and also to feed upon.

Predicted distribution of *Buceros rhinoceros* at Berbak Carbon Initiative



Habitat suitability
Buceros_rhinoceros.asc
Value
1
0

Tree species distribution

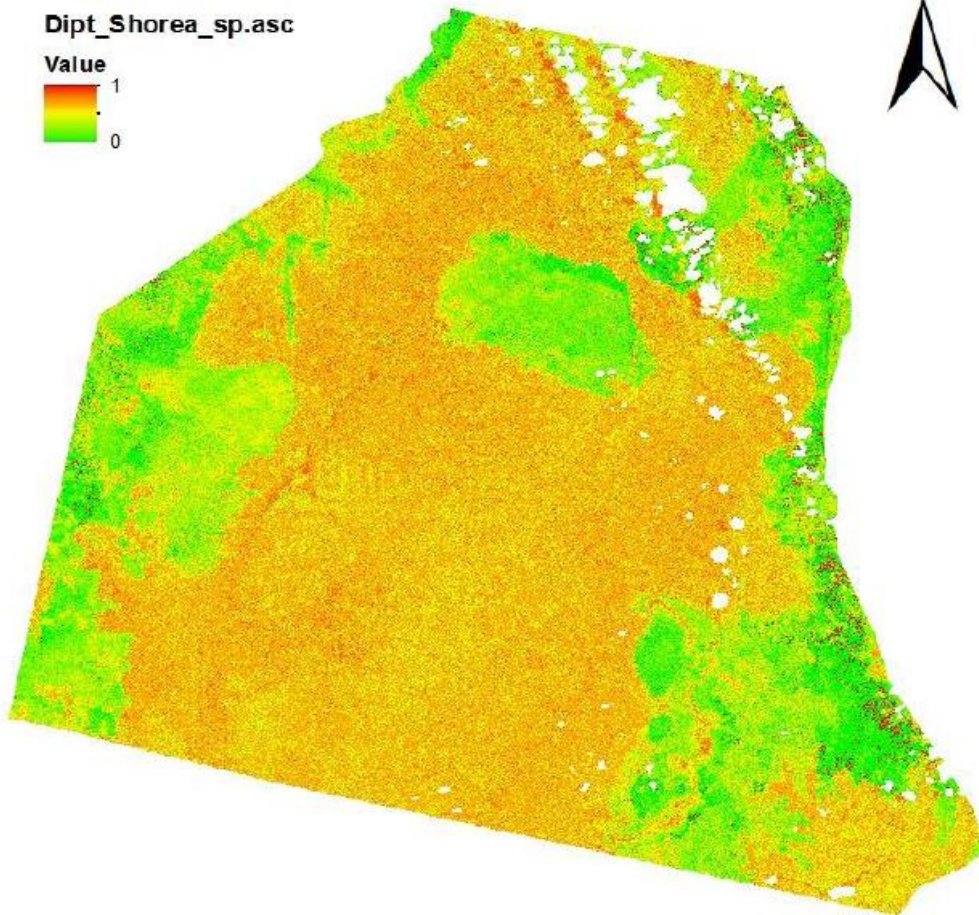
We modelled the distribution of four economically important tree species. As with the forest dependent hornbill, tree habitat is predicted apparently NDVI, such that fairly clear boundaries exist in the model between forest and non-forest habitat. Obviously, forest trees are not likely to be found in deforested areas. Nonetheless, the Maxent output does show some variation particularly in the south west portion of the map in the protected forest (hutan lindung) where canals and other incursions seem to have reduced the canopy cover, resulting in lower NDVI readings from the remote sensing data.

Shorea sp (Dipterocarpaceae)

Legend

Dipt_Shorea_sp.asc

Value



Discussion and ideas for model development

Our initial results showed some promising variation in the predicted habitat suitability in accordance with ecological knowledge of the focal species. The generalist species were predicted to have more suitable habitat outside the main forest block, whilst the habitat specialist was predicted to have more suitable habitat inside the forest block. The selection of birds with such specific habitat requirements (nesting in old trees) may prove useful in assessing the quality of habitat across the site in the medium term.

We chose the particular cases of the generalist Myna versus the specialised Hornbill since they show the maximum variation in our models. However, there is a great deal of similarity between the models we have produced, largely falling into two categories: 1. generalists who are predicted to have more suitable habitat outside of the heavily forested areas, and a 2.) forest specialists who are predicted to find habitat in the forested areas only. This apparent partitioning suggests that our models are detecting macro-scale differences in habitat suitability, and will ultimately demonstrate the difference in species composition of the broadest land use types at Berbak, rather than providing fine scale distribution maps. This is probably because:

a) whilst we have data on the presence of 177 species at the site, all of this data comes from only 24 observation sites. This necessarily limits potential to explore more sophisticated differences in distribution between each species, since there is only ever a maximum of 24 data points to provide variation in habitat preference;

b) there is such a clear division between land cover at the site, and relative homogeneity within each habitat type i.e. rather than having a gradation between forest to non-forest, abrupt transitions from forest to non-forest occur (e.g. at the edge of burn zones), and when the forest does begin, the variables that we have measured so far (e.g. NDVI) are relatively homogenous on this small scale.

In order to refine our models, we therefore intend to:

1. develop further predictor variables based on the remote sensing layers, such as the degree of fragmentation; variation in remote sensing variables such as NDVI as proxy measures for disturbance (*sensu Lahoz-Montfort et al., 2011*).
2. supplement the existing data sets with repeat surveys, and adding extra survey points in the blocks of primary forest.
3. employ presence/absence models using the “R” package to test the performance of models between this and the Maxent outputs.

LAMPIRAN 6

SURVEY OF PERCEPTION, BEHAVIOUR AND COMMUNITY NEEDS IN SIX VILLAGES SURROUNDING BERBAK NATIONAL PARK, JAMBI PROVINCE, SUMATRA WITH RELATION TO REDD+ PREPARATION ACTIVITIES

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ZOOLOGICAL SOCIETY OF LONDON

Bogor, May 2012

EXECUTIVE SUMMARY

The efforts to Reduce Emissions from Deforestation and Forest Degradation in developing countries, or REDD+, should also produce the additional benefits of poverty reduction, sustainable livelihoods, good governance and protection of people's rights and community adaptation to climate change. Berbak National Park is experiencing intense deforestation and the threat to Berbak's biodiversity and forest carbon stocks makes it an ideal location for REDD+. To successfully implement REDD+, research into community perceptions, behaviour, and needs, within the context of REDD+, is required.

This report is a descriptive analysis of data derived from questionnaires distributed to respondents, field observations, and focus group discussions. The study was conducted in rural areas bordering Berbak National Park including the villages of Sungai Rambut, Air Hitam Laut, Sungai Jambat, Rantau Rasau, Sungai Cemara and Telago Limo in the District of Tanjung Jabung Timur, Jambi Province, Sumatra. A purposive sampling technique was used, covering 2473 households and 516 respondents.

After data analysis using Software SPSS, the conclusions of the survey are as follows:

- a. Current economic activity and community behaviour are disrupting the ecosystem integrity of Berbak National Park and its remaining peat forests and identifies the community as one of the key drivers of deforestation and forest degradation in Berbak.
- b. There are people in the communities bordering Berbak National Park who, although generally classified as economically poor, are aware of the condition and function of the forest and the damage that bad practice can cause to the availability and condition of resources which are perceived as important for community survival. They are aware of the biodiversity of Berbak National Park and the importance of maintaining its resources, both abundance and quality. However, there remains a gap in perception and resulting actions/attitudes towards exploitative and sustainable utilisation of forest resources.
- c. With relation to the institutional management of the National Park, the community perceives that it is not part of the National Park's management institution, so is not bound by National Park management rules. As a result, villagers tend to use National Park forest products for economic gain. Community perception of the forest is based on to their desire to gain economic benefit from the the forest regardless of the laws governing the National Park area.

However, the villages around Berbak National Park have the potential to gain additional economic benefit from the implementation of REDD+ in Berbak such as reduced poverty, improved governance and the implementation of community forest management rights. This survey also identifies several incentive-based strategies to balance the needs of the local community with the goal of reducing emissions from deforestation and forest degradation.

METHODS

The survey was conducted between December 2011 and February 2012, including field data collection, data analysis and reporting. The substance of the survey is related to assessing community perception and behaviour regarding the destruction of forests and requirements for forest preservation.

The selection of villages for inclusion was determined by a ranking system. To simplify the selection process, a cluster approach was devised, based on the topography of the Berbak buffer zone ecosystem. The Berbak ecosystem is divided into three topographical types: coastal, river, and land. In-depth study was conducted in six Berbak buffer villages which are representative of these three clusters. Two coastal villagea and four river villages and one land village were selected as representatives of their “type” selection being determined by a matrix ranking process based on criteria designed to fit the needs and desired outputs of the study.

Criteria for rating villages for inclusion in the study included: 1) distance of the village from the Berbak ecosystem: “**Distance**”; 2) the level of community dependence on the Berbak ecosystem: “**Dependency**”; 3) the socio-economic status of the community living around the Berbak ecosystem: “**Social Economy**”; 4) village experience of assistance from NGOs and government bodies, especially forestry institutions: “**Mentoring**”.

After conducting reviews and based on the matrix ranking above, the villages selected as target survey locations are:

Table 1. Villages Selected for Inclusion

No.	Village	Subdistrict	District	Cluster
1.	Sungai Cemara	Sadu	Tanjab Timur	Coastal
2.	Sungai Rambut	Berbak	Tanjab Timur	River
3.	Air Hitam Laut	Sadu	Tanjab Timur	Coastal
4.	Sungai Jambat	Sadu	Tanjab Timur	River
5.	Rantau Rasau	Berbak	Tanjab Timur	River
6.	Telago Limo	Berbak	Tanjab Timur	River

Sampling is conducted using a purposive sampling technique. That is sampling which is designed to fit a particular purpose. Purposive sampling was used in this study to focus on communities whose activities are related to proximity to the forests of the Berbak ecosystem. The sample selected to describe the population represented between 5-10% of the total population. The more homogeneous the population, the fewer the number of samples taken. A questionnaire was distributed to the community then interviews were conducted with several stakeholders including sub- district authorities, prominent community members, religious leaders in the sub-district/village and other appropriate stakeholder representatives.

Surveys were conducted by two interviewers recruited from the village, one male and one female, who were trained by ZSL prior to conducting the surveys. Questionnaires were given to as many as 20% of households from each village and the number of respondents balanced 50%/50% between male and female in each village. For ease of communication and openness, male respondents were interviewed by a male interviewer from the same village, and female respondents surveyed by a female interviewer.

The number of respondents from each village, representing 20% of households in total, is outlined in Table 2 below:

Table 2. Number of Respondents for Each Selected Village

No	Village Name	Total Number of Households (Kepala Keluarga)	Number of Respondents / Sample Size	
			Male (10%)	Female (10%)
1	Air Hitam Laut	439	44	44
2	Sungai Jambat	747	75	75
3	Sungai Cemara	95	10	10
4	Sungai Rambut	160	16	16
5	Rantau Rasau	704	70	70
6	Telago Limo	258	26	26
Total		2473 KK	258	258
Total			516 Respondents	

In order to obtain a comprehensive data set, Focus Group Discussions (FGD) were also conducted in addition to in-depth interviews with key community figures.

This survey employed qualitative descriptive analysis techniques. The data analysed comes from respondents' answers to the questionnaire presented by the researchers. To provide a framework for qualitative descriptive analysis, the basic theory of environmental psychology is used, so that the analysis performed has clear direction, grouped into thematic analysis areas. The findings of thematic analysis are then connected to each other using the theory of natural resource conservation, so that conclusions can be drawn concerning the perception and behaviour of the community in the context of the conservation of natural resources, which in this case are the forest resources.

Respondents' responses to the questionnaire are first tabulated in SPSS Software Version 9 to produce the raw data. After that, the raw data were analysed using frequency analysis tool on the pull-down menu which is the *Analyze-Descriptive SPSS is Statistics-Crosstabs/Frequency*.

The output of crosstabs or frequencies is then analysed using the theory of analytic studies. Conclusions and recommendations are then made after each field of study has been analysed.

CONCLUSIONS AND RECOMMENDATIONS

Based on the study analysis, we conclude that the development of agricultural cultivation activity around the Berbak forest area has disturbed the natural balance of the National Park. The increase in human-wildlife conflict, forest fires, illegal logging, wildlife hunting, illegal fishing, forest clearance and the construction of drainage canals and ditches all cause damage to the Berbak ecosystem.

Public knowledge of the natural environment surrounding their villages is generally quite good, understanding the condition and function of forests, access to and correct utilisation of forest products and the biodiversity supported by the ecosystem.

In general, the communities in the research villages are still aware of the existence of forest in the area, including the Berbak National Park Conservation Area. Villagers are generally aware of the condition of the rivers, lakes, and swamp areas in and around their villages, perceiving it to be fairly good or good. However, in some villages, the condition of rivers, lakes, and swamp is perceived to be quite bad. This is attributed to the natural process of peat oxidation which forms pyrite layers.

The understanding of rural communities bordering Berbak National Park the extent to which natural resources (forest, rivers, lakes and swamps) have been damaged is relatively less. Communities are aware that one of the main causes of forest damage is by forest fires that often occur in rural areas and are often caused by human carelessness.

Most of the villagers have some knowledge of biodiversity types and are aware of the presence of hornbills (*engang*), eagles, stork *tongtong* and Sumatran tigers in and around their villages.

Wild animals in Berbak National Park often cause problems for the rural communities bordering the park. Wildlife have become pests in community plantations and can cause problems to the community-owned livestock.

In relation to the utilisation of biological resources, perception was divided. There are some in the community who believe that the collection of fish, birds, wild animals, sandalwoods (*gaharu*) and jelutung from the forest is not done destructively and that these resources are used sustainably to meet the needs of the community. However, others believe that natural resources are collected in a destructive and non-sustainable way. Despite the divided perception, most communities still utilise the available natural resources such as timber, fish, bird nests, river rock and sand for commercial purposes.

A small number of local people enter the protected forest areas adjacent to their villages to collect forest products such as fish, birds, wild animals, birds' nests, wood, rattan, sandalwoods (*gaharu*), and jelutung.

Communities generally understand that the forest functions as a water reserve and to prevent floods during periods of high rainfall. Communities also perceive the forest as having many other functions including being a habitat for fauna and flora as well as providing a source of community income.

There are different perceptions about forest function. Based on the theoretical study, the primary function of the forest being a National Park is to protect and manage the forest and ensure its resources are used sustainably by management zoning. Thus, community cultivation activity should not be located in the core forest zone of the National Park.

However, in actuality, community perception is that the forest has many functions: a place to store water and prevent flooding/erosion (ecological function); a place providing resources to earn a living (economic function); a habitat for animals and plants.

Most local people know that there is legislation governing forestry (Act No.41 on Forestry), but most of them do not understand the substance of this legislation, especially regarding the use of natural resources and ecosystem conservation. Because the community lack understanding of the regulations related to forest conservation, they do not have a full understanding of the conservation of the National Park. Also, importantly, the community do not know their rights and obligations within the framework of forest conservation, so that the actions of the people living around the forest area are not influenced either by their own rights or by the obligations as mandated by forest law.

Generally, the existence of the Berbak National Park is known to the public, but community involvement in management activities is very limited, either planning or implementation. In general, people do not want to be involved in the management of Berbak National Park, possibly due to public perception that it is the role of institutions to manage the National Park Berbak.

Public perception is that community dependence on forest resources is high. Most people have a high dependence on non-timber forest products, either for personal use or as a source of family income, including the sale of hunted animals such as deer, wild boar, birds and fish.

The most important natural resource according to community perception is rice fields, followed respectively by clean water, timber, soil, rattan, forest, palm plants and swallow nests. The main function of these important natural resources is to ensure community survival, providing a source of income, medicinal products and a food supply.

Most communities perceive that it is relatively difficult to access natural resources important to the community, either due to naturally difficult terrain, natural changes to the environment and destructive and unregulated collection methods.

Public perception is that the main threats to the forest, especially in the Berbak National Park area, are illegal logging, forest fires, forest clearance for agricultural use, and the construction of drainage channels/ditches which cause the swamp to dry out, increasing the risk of forest fires.

Most illegal logging is driven by the economic needs of the community, followed by home construction, human greed and the demand for firewood. Community perception is that most forest fires are caused by forest clearance to open land for agriculture. The community believes that most forest clearance is driven by economic need, with unemployment being another major motivating factor.

Community perception is that the increased construction of drainage channels in the Berbak area is motivated by ever-growing demand for agricultural land.

According to public perception, within the next 10 years the availability of important natural resources will be increasingly reduced and resources may even disappear if protection and conservation activities are not implemented. Most communities are aware of the need for conservation measures to ensure the continued availability of important natural resources.

In the context of the conservation of Berbak National Park, most people understand the need for the conservation of the Park, primarily for economic reasons but also for ecological reasons, and many people perceive both economic and ecological factors as equally important reasons for conservation.

Although the majority of rural communities around the Berbak National Park want to preserve the forest, most people never take any action to protect the forest. Very little conservation initiatives in Berbak National Park involve local communities. However, some survey respondents did report that they had taken conservation action by refraining from taking non-timber forest products as well as providing information on the legislation regarding collection of non-timber products such as rattan, sandalwoods (*gaharu*), resins, bird nests, and jelutung sap to their friends and neighbours.

In association with preparation for the implementation of REDD+, it was concluded that the villages around the National Park have the potential to gain additional benefits from the implementation of REDD+.

Survey results show that local communities have been identified as one of the main perpetrators of deforestation and forest degradation in the Berbak peat forest area. Human-driven damage includes careless land clearance methods leading to forest fires, illegal logging and the construction of canals/ ditches in the peat swamp forest. However, in line with the community awareness of the declining quality and availability of natural resources, local people are still keen to see conservation action being taken, especially the preservation of the natural resources perceived to be essential for community survival.

Additional benefits of the implementation of REDD+ can be achieved through the reduction of poverty, improved governance and clarification and enforcement of the rights of local communities through their involvement in forest management. This can be in the form of zoning activities to delineate village forest and community plantation forest, river fish farming can be developed in river nets, jelutung gardens created, eel cultivation increased and coconut fibers can be processed and sold. The success of these activities would, in turn, lead to improved social services such as education and health and clarify access rights to basic non-forest land.

The survey has identified some incentive-based strategies to balance the needs of the community with the need to reduce emissions from deforestation and forest degradation, namely:

- a. Performance-based payments or other benefits to incentivise reduced deforestation including: reward carbon stored as a result of land restoration; prevention of forest fires; matching conservation targets through sustainable forest management; compensation for costs associated in changes in lifestyle such as improved public infrastructure and subsidies to initiate alternative livelihoods.
- b. Clarity and security of community land tenure rights through formal legal recognition of local community rights to manage its forests, forest lands and forest products.
- c. Access to alternative income to preserve and reduce pressure on forest resources. Efficient use of land for the intensification of agricultural production in non-forest areas and reduce the pressure on the forest for land conversion. Follow and enforce the rule of law and policy in forestry and conservation.

LAMPIRAN 7



WILDLIFE CRIME AND DETECTION IN BERBAK

Maintaining and Promoting Wildlife Crime Action
Network in Berbak National Park

First year Report to SEGRE Foundation

ZSL Indonesia - October, 2012



A. Executive Summary

Poaching of tigers and their prey, as well as killing of tigers in response to conflicts, are the two major causes of Sumatran tiger deaths at human hands. ZSL has now set up two “Wildlife Conflict and Crime Response Teams” (WCCRTs) to address key threats to tiger including poaching, illegal trading and other human-wildlife conflict. The first, well-established team operates in and around Berbak National Park in Jambi, Province. It is a multi-stakeholder unit consisting entirely of seconded staff from various relevant government authorities, so that whatever offence or problem the team comes across can be officially dealt with by the appropriate government agency. The team is now widely respected by the public in Jambi for its dedication and capacity in resolving wildlife conflict and crime. A second WCCRT has now been set up, following this successful model, to work in and around Sembilang National Park, which lies adjacent to and south of Berbak in the next-door Province of South Sumatra. Thus, protection is now in place across the whole of the Berbak –Sembilang peat swamp ecosystem along the east coast of Sumatra, one of the most important tiger conservation areas on Sumatra. Please see map on page 4.

The political background for operation of the Jambi Province team has been strengthened by the signing of an MOU between ZSL Indonesia and the Natural Resources Conservation Agency (BKSDA) Jambi, as well as a second MoU between ZSL and BKSDA South Sumatra (SumSel). The MoU with BKSDA (Jambi) was further supported by a Decree from the Head of BKSDA to the various Department Heads of each team member in that province to support the creation of the team. This has cemented the role of the team and promoted joined-up management, and will further elevate the position of the WCCRT politically with other groups involved in dealing with human-wildlife conflict and environmental crime issues in Jambi Province. A further letter of support is now being drafted by the Head of BKSDA (SumSel).

Anti-poaching activity

The WCCRT and ZSL’s field teams carried out two snare sweeping surveys in Berbak National Park to clear snares set for deer, pigs, and potentially tigers. The first snare sweep was in direct response to the loss of a tiger which got caught in a snare that had been set for deer and was unable to escape. ZSL’s field team discovered the fully intact remains of the tiger near one of our key camera trapping sites and thus were able to establish the date of the death to within one month. This four day sweep of the area discovered 15 snares, mostly in close proximity to the river as the forest is difficult to move around in.

Both the WCCRT teams have now received training in law enforcement data collection while patrolling and will be receiving training in the new SMART software in the near future. SMART is a specialist wildlife law enforcement database software being developed for use around the world by a consortium of NGOs including ZSL.

Conflict Resolution activity

The WCCRT have attended eight tiger human conflict, tiger protection and potential crime incidence in the last year, three of which resulted in tigers including two tiger cubs being rescued. However, the most dramatic occurrence of the last year of a new and emerging direct threat to tigers was the discovery of deadly high voltage electric fences. A large male tiger was electrocuted on the edge of the park by high-voltage electric fence set up to protect community-owned plantations from deer and pig incursions. Steps are now being taken to ensure these fences, which can be lethal to humans as well as tigers, are replaced with safer alternatives. Several meetings with community members have been held and a test kit (generator, solar panel, batteries) is being piloted close to the village where the death occurred. The WCCRT are also working alongside the senior village and district members to draft a regulation to ban the use of these high voltage deadly fences.

GPS collaring study preparations

Permission for captures has been obtained from the Ministry of Forestry, three GPS tiger collars are now in- the project office awaiting use and tiger monitoring has been put in place at suitable sites to establish the best locations for tiger captures. Local BKSDA approved veterinarians have been trained to assist with the capture, immobilization, health check and release and are now on call.



WCCRT Jambi
Team members:
(clockwise from
left sitting) Heva
Edison, Sartono,
Havis Badaruddin,
Nurazman
(lead).Mahfuddin
and Ade Irawan.

Training of
WCCRT
(SumSel) Team
by WCCRT
Jambi

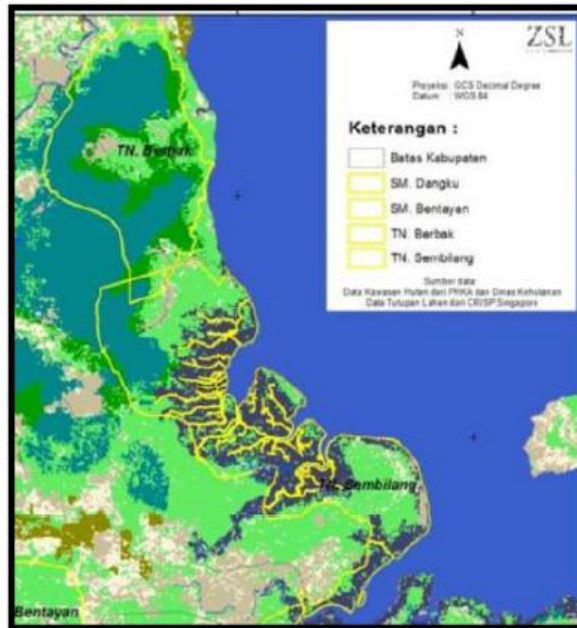


Hefa (WCCRT Jambi) fighting a
fire to rescue a female tiger
caught by the fires and a snare.

B. Current Status of Work

1. Wildlife Crime team (WCCRT) activities and results

In April 2012 ZSL signed an MoU with Sembilang National Park, which is adjacent to Berbak National Park. Sembilang is located in South Sumatra Province, a different administration to Berbak. A MoU has also been signed with the BKSDA of South Sumatra to enable creation of a mirror WCCRT in South Sumatra so that a holistic approach to tiger protection and conservation can be established in this landscape. A team of eight staff has now been recruited for Sembilang and have undergone training in wildlife survey and monitoring techniques as well as a review of conservation and wildlife laws related to their new role.



The original WCCRT in Jambi has now recruited eight Community Volunteer Rangers, thus increasing their operational capacity and their links with communities, which will improve gathering of intelligence on events in and around the National Park. The newly established team in South Sumatra is in the process of consulting local village groups with a view to doing the same thing. A community hotline for South Sumatra/Sembilang will also be established, again as has been done in Jambi/Berbak. Both WCCRT (Jambi) and WCCRT (South Sumatra) will be receiving Law Enforcement Management and SMART patrolling training in November. "SMART" is the next phase of development of the anti poaching software "MIST". As the software will be ready for release in January 2013, it was decided to train the teams in field data collections techniques first and then deliver the SMART software training early in 2013 rather than deliver MIST training. MIST will soon become obsolete, and its use across Sumatra will be phased out in Indonesia over the next 12 months. (For more information about SMART please follow this link <http://www.smartconservationsoftware.org/>)



The WCCRT Jambi and WCCRT SumSel received training on patrol planning, data collection, survey techniques, and legislation relevant to anti-poaching

A Standard Operating Procedure (SOP) document for both WCCRTs has been produced, covering all aspects of responding to human-tiger conflict problems, collection and analysis of information, database management, victim compensation and legal processes and procedures. (See Year One - Six month report)



The six strong Jambi WCCRT team has undertaken on average five days per month patrolling the boundaries and buffer zones of the national park totalling 48 patrol days. The team attended the ZSL field team's discovery of snared tiger remains within the NP. Two separate snare sweeping activities have been undertaken by WCCRT and ZSL with an average of 15 snares being removed during each sweep. Additional snares sweeps along with more frequent and focused patrolling efforts are now being developed and coordinated between ZSL/WCCRT and the NP. These national Park-driven patrols will be undertaken using matched in-kind

funding from the NPs as well as funding contribution for coordination from both the SEGRE and the Save the Tiger Fund grants.

The Jambi hotline currently receives approximately one call per week. Once a call is received, these calls are verified by the WCCRT Jambi before field operations are undertaken. Three of the calls were followed up by the whole team; two led to cubs being rescued and a third a tigress being released from a snare and treated. Other human-tiger conflict incidents can be seen in Appendix 1. In total, at the incidents attended three tiger cubs were saved and two adult tigers. Two other call-outs resulted in no retaliation against the tiger being taken by the plantation workers. The hotline for South Sumatra is being set up now.

During 2012 a new kind of conflict problem arose when a tiger was killed by a high voltage electric fence set up to deter crop-raiding by wild pig and deer, using large unregulated generators to power this electricity. These fences can be lethal to humans as well as wildlife and the Jambi WCCRT has worked closely with the local (district and village level) senior administrators and heads of villages to abolish them. A local district level regulation (*Perda*) has been drafted, which will impose a penalty (a monetary fine and confiscation of equipment) on anyone using high voltage electrical fences for crop protection. The *Perda* is now at the final consultation phase with village councils and district heads and should be released early 2013. They will be administered by village councils and will be supported by the WCCRT, providing guidance to farmers on how they can use alternative deterrents for crop-raiding species. The WCCRT have also set up tiger-friendly (i.e. not fatal) electric fences in three villages for testing, hoping to provide clear evidence to communities that these fences work, deterring pests such as wild pigs while posing no threat of death to tigers, or indeed humans.

To promote this work, the WCCRT team conducted a one-day workshop in Muara Sabak, capital of Tanjung Jabung Timur District, Jambi discussing “Sumatran Tiger Conservation: Human-Tiger Conflict Mitigation, human-friendly and wildlife-harmless electric fence technique”. Keynote speeches were given by the Institute Teknologi Padang (Padang Institute of Technology) West Sumatra, Forum HarimauKita (the Sumatran Tiger conservation forum, for tiger conservationist), the Head of Berbak National Park and the Head of BKSDA Jambi. The workshop attracted 30 participants from 12 agencies plus NGOs.



The WCCRT publicity campaign continues in the villages in Jambi Province with posters explaining the role of the WCCRT. In 2013 a calendar – a popular item locally - will be distributed to homes and government offices to publicise the work of the WCCRT and the 24 hour conflict resolution hot line as well as to provide information about the laws and regulations regarding wildlife conservation.

As part of the International Tiger Day celebrations on 29th of July, WCCRT, ZSL-Indonesia, Taman Rimbo Zoo, BKSDA Jambi and BKSDA Sumatera Selatan conducted two activities;

- Colouring and drawing competition for elementary kids at Taman Rimbo Zoo
- Street banners on several strategic points within the cities, Jambi and Palembang.

The banner placements were mainly at airports, busy-popular junctions, in the front of well-known campus and malls.

2. Conflict Resolution Guidelines produced.

Using additional funding from the UK government, ZSL has worked with the Ministry of Forestry and appropriate experts to produce a set of official Indonesian government guidelines for dealing with all aspects of tiger-human conflict. Nested within the conflict resolution guidelines is a set of veterinary guidelines for rescuing conflict tigers, including anaesthetics and transportation. These guidelines were developed as a result of a veterinary training workshop in January, at Taman Safari Indonesia (TSI), Indonesia’s largest zoo. Attended by government approved vets from each province in Sumatra, training was delivered by senior vets from TSI, ZSL London Zoo and Wildlife Vets International, and was approved by the Indonesian Medical Veterinary Association.



The entire set of guidelines were been approved and endorsed by the Director General of Forest Protection and Nature Conservation (PHKA), Indonesia's Ministry of Forestry in October 2012, and an official launch is planned for December 2012. In addition, the veterinary guidelines have been endorsed by the Indonesian Medical Veterinary Association making Indonesia the first tiger range country to have such groundbreaking documents.

These documents and the training comprise a major contribution to tiger conservation in Sumatra and will also be extremely useful to ZSL in implementing the GPS radio collaring study. The guidelines are supplied as Appendix 2.

3. GPS Radio collaring study progress

Permission has been obtained from the Ministry of Forestry for wild tigers to be collared and tracked to provide vital information on tiger movements and use of landscape in the region. A Tiger Coordinator has been appointed to lead this study, and a BKSDA tiger collaring support team has also been set up. This exciting and innovative study, the first of its kind ever to be done on Sumatra, will allow us for the first time to assess how tigers move through their natural environment and utilise resources, so that conservation measures can be targeted where they are needed most. The veterinary guidelines mentioned above will be used to guide staff during this study, and Wildlife Vets International is now actively seeking funding to provide expert veterinary oversight of the captures. Camera traps are currently in place are being used to determine the best possible sites for capturing and collaring suitable individuals for this study.



APPENDIX 1

TABLE 1. Human-Tiger conflict in Jambi Province (December 2011 – November 2012)

WILDLIFE CONFLICT TYPE	DESCRIPTION	LOCATION	DATE	FOLLOW-UP EFFORT TO ADDRESS HUMAN-WILDLIFE CONFLICTS
Protection (P)	Female and cub Sumatran Tiger entered the oil drilling area.	Oil drilling areas of PERTAMINA (state owned oil company) in Sungai Gelam and near settlement areas, Muaro Jambi District	29 December 2011	Ground truthing, search tiger tract to find tigers presence, recorded geographical coordinate point and documented evidence. Held THC socialisation meeting with PERTAMINA employees and the local community, with guidelines on how to take a care when working in the field. Developed an information monitoring system for checking tiger presence in the area.
Tiger Human Conflict (THC)	2 local residents injured and 1 hunting dog killed.	Community-owned rubber plantation, Merangin District	January – February 2012	Ground truthing search tiger tracks to confirm presence. Recorded geographical coordinate point, documented evidence, set up local task force, installed camera traps to monitoring tiger presence. Held THC socialisation meeting with local community and urged all to take a care when in their plantation.
Investigation (I)	1 tiger killed by a snare.	Berbak National Park Forest, Tanjabtim Timur District	15 February 2012	Ground truthing, removed the carcass and conserved part of the tiger's body. Recorded geographical coordinate point and documented evidence. Formed an investigation team to find the suspects and remove remaining snares.
Investigation (I)	1 female tiger electrocuted by high-voltage electric fence.	Community-owned palm oil plantation, Air Hitam Laut village, Tanjabtim District	30 March 2012	Ground checks and removed carcass, and conserved the tiger's body which was still intact. Recorded geographical coordinate point. Crime scene investigation involving Regional Police to bring this case into the legal system, to act as a deterrent to other people who use high-voltage electric fence to protect their gardens from pests, especially pigs.

Investigation (I)	1 tigress trapped by opportunistic snares	Muara Imat, Kerinci and Merangin District	26 May 2012	Ground checking, located tiger tracks and position. Immobilization steps and rescued to Jambi. The tigress <i>Siti Emat</i> is now kept in Taman Rimbo Zoo, having undergone treatment and is now waiting for a suitable release site to be identified. It is expected that she will be the first tiger to be collared.
P	Two tiger cubs abandoned by their mother due to forest fire	Ladang Panjang, Sungai Gelam, Muaro Jambi District	02 September 2012	Ground checking, took formal investigation with the reporter/villager filled government document form for wildlife hand over. The cubs sent to Taman Rimbo Zoo. Unfortunately one cub died two days after being rescued due to dehydration and malnutrition, with the second cub dying of unknown causes in mid November.
THC	A tiger trapped by forest fire	Ladang Panjang, Sungai Gelam, Muaro Jambi District	04 September 2012	There was forest fire incident. One of WCCRT team member who also part of Forest Fire Brigade discovered a trapped tiger inside the burning bush. After the forest fire brigade extinguished the fire, the tiger moved freely back to Berbak forest.
P	Mud-trapped tiger cub near oil drilling in Bayung Lincir	Sungai Kemang, Bayung Lincir, Musi Banyu Asin, South Sumatra	16 October 2012	An informant reported the Tiger Conservation Manager that a tiger cub was trapped in mud, in an oil drilling area in Pulau Gading Village. The cub was then released by the oil workers as they did not want the mother coming in to their camp, as with workers in Sungai Kemang. South Sumatra WCCRT was informed of the incident and reviewed the incident with the workers and notified to report to WCCRT and BKSDA Sumsel if there any further incidents or the cub returned.



Conservation Programme

WILDLIFE PROTECTION AND COMMUNITY RANGER SUPPORT UNIT SCHEME

BERBAK NATIONAL PARK, SUMATRA, INDONESIA

Laura D'Arcy, Erwin A Perbatakusuma and Dolly Priatna

6th Monthly Report to the Taronga Foundation Field
Conservation Grant Programme from the Zoological
Society of London, Indonesia Programme.

August, 2012

TARONGA
CONSERVATION SOCIETY AUSTRALIA

PROJECT TITLE:

WILDLIFE PROTECTION AND COMMUNITY RANGER SUPPORT UNIT TEAM IN
BERBAK NATIONAL PARK

CONTACT PERSONS:

Laura D'Arcy, Country Coordinator, ZSL Indonesian Programme.
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1. Project Summary

The aim of Taronga funding is to strengthen the foundations and encompasses the competencies of the government-owned Wildlife Conflict and Crime Response Team (WCCRT) in tandem with strengthening the team's community support network, building upon the successes of team to date. This will be accomplished by completing five key objectives, over two years each comprising a set of specific activities a). Carry out patrol-based law enforcement monitoring (LEM) practices and Management Information System for Tigers (MIST) training for the WCCRT, b) MIST and LEM to be implemented, c) Community Rangers Support Unit (CRSU) scheme to be established, d) improve community awareness, and, e). Provide ongoing technical support for implementation of MIST protocols.

As a result of funding received from Taronga during 6th monthly project implementation used for: a) Carry out a 4-day intensive training courses on MIST will be delivered to the WCCRT, ZSL staffs, National park managers and forest guards in Berbak National Parks, b) Identify suitable candidates for community rangers is an important step, it is vital only enthusiastic and honest rangers are given the training investment.

Throughout the first 6 months funding period the member of WCCRT received 4-day MIST intensive training courses and 4 days forest patrol training. During this funding period, WCCRT also has conducted an inventory and selection of candidates for CRSU in 6 villages that are known vulnerable to tiger -human conflicts in adjacent areas of Berbak National Park.

Over the future 6 months funding period will carry out several activities planned, which are implementation of MIST and LEM practices, training of recruited CRSU, support CRSU regular patrols and improve community awareness through producing simple posters and leaflet and community awareness road show.

2. Progress project status for 6 months

2.1 MIST Training Course and Introducing of MIST

MIST training was conducted in 3 – 8 January 2012 in the ZSL office Bogor. The four day classroom-based training was aimed at increasing the skill and capacity of 2 (two) WCCRT members (Heva Edison, and Havis Baharuddin) and 3 (three) ZSL staffs. Mr. Dudy Nugroho, MIST trainer led the training, sharing his knowledge of how to use MIST to develop a database system to manage wildlife monitoring data.

Training activities have also been produced and training participant agreed on sheet forms to be used in the MIST data collection in the field, particularly in Berbak NP and Sembilang NP. Detail MIST entry sheet is shown in appendixes of report.

MIST training activities has generated new knowledge for participants who received training as described below.

MIST (Management Information SysTem) has been designed for monitoring anti-poaching patrol efforts or Law Enforcement Monitoring (LEM) and results. MIST is a GIS (Geographic Information System) database, which means that all data are linked spatially and information can be presented in a highly visual form, using maps and graphics. Using standardized performance indicators, MIST makes it possible to assess and compare patrol efforts and results over time and across teams and sites. The implementation of MIST along with additional support for anti-poaching patrols and law enforcement monitoring, has achieved the following results across a number of tiger conservation sites in Asia, i.e Thailand such as a) Better planning of anti-poaching and law enforcement efforts, b). A means of adaptively responding to newly emerging or changing threats, c). A standard means of assessing success across sites and over time, d). Improved morale of rangers and, and e) Determine densities of tigers and their prey.

WHAT MIST AND ITS STRONG POINT?

- A GIS-based spatial Management Information System and developing for adaptive patrol motoring system Law Enforcement Monitoring (LEM) system
- Undergoing development since 1997 by Uganda Wildlife Authority
- Subsequently implemented in protected areas in both Africa and Asia
- Developed as a user-friendly client/server application program
- MIST has a strong point, including
 - a) Fast and accurate data entry : GPS data download, Use of look-up lists and tick boxes for observations and Avoid “type-in” mistakes

- b) Automatic monthly reporting and maps : Customizable site-specific report formats, GIS mapping interface, Trends analysis.
- c) Easy to produce reports on anti-poaching and law enforcement efforts, and results with highly visual graphs, tables and maps.
- d) User-friendly, easily accessible and easy to maintain and up-date: No need for GIS or database expert

HOW DOES MIST WORK AND PROCESSES AT SITE LEVEL?

1. Data Collection: Anti-poaching teams or law enforcement monitoring patrol record their patrol routes with GPS units. Location, date & time of patrol, animal observations & signs Including data on any abnormalities (death, illness etc), human activities (Hunting, logging, fishing, NTFP collection and land clearance activities), presence of cartridges, road, settlement, camps & vehicles, Law enforcement activities (warning letters and contracts issued on confiscations). Data on anti-poaching (e.g. arrests, fines, confiscation of weapons), or law enforcement and evidence of tiger/leopard presence are entered on specially designed forms.
2. Data storage: Data from the forms and GPS waypoints are stored in a MIST database.
3. MIST Analysis, Evaluation & Reporting : Data are processed into highly visual tables, charts and maps showing patrol effort, coverage and results, disseminate monthly, national and site copies to relevant stakeholder.
4. Feedback: Strategic, regular meetings or debriefing with patrol rangers are held to discuss patrol efforts and results, trouble shoot problems, clarify discrepancies, complete missing information, monthly planning and set new patrol targets

OUTPUTS PRODUCED BY MIST

- Indices for monitoring of wildlife populations and human activities
- Distribution maps (threats, wildlife, patrol intensity) for planning and monitoring
- Baseline information for patrol deployment planning
- Performance indicators
- All reporting requirements

MIST BEST PRACTICE FOR ALL LEVELS

- Quality information-based decision making
- Short and long term planning for anti-poaching and law enforcement efforts
- Data System with systematic and standardized
- Better monitoring tool
- Rangers-based or resort-based management level
- High morale and self esteem (good spirit)
- True capacity building for stewardship
- Concrete performance-based monitoring and lesson-learned practices.

2.2. Patrol Training Course

Patrol training workshop was conducted by ZSL Indonesia in 26 – 29 September 2011 in the Manggala Agni office at Bayung Lincir South Sumatra and involving 48 participants, including WCCRT members. The four day classroom-based and field-based training and there were three main elements on the training agenda: patrol Training; patrol collaboration; and tiger identification research using camera traps. This training was aimed at increasing the skill and capacity of 5 (five) WCCRT members, including Hafiz Badarrudin , Hefa Edison, Mahfudin , Sartono and Ade Irawan on forest patrolling .

The training workshop began with an explanation of the theory behind and practical application of patrol activities. Training material including animal identification and monitoring, patrol management system, detailed patrol concept, patrol simulation, anti-poaching concept and activities and database system

After completing the class-room patrol training programme, the patrol team was conducted field-based patrol training. The patrol team allocated field equipment and presented with the planned patrol routes. The team included WCCRT – Jambi, BKSDA and CRSU, ZSL staff and student volunteers from a local university. The purpose and aim of the patrol was to follow up on the findings of previous patrols, check for encroachment and illegal logging and survey for evidence of tiger presence in the area. The team discussed the planned patrol routes and purpose and split into 2 teams with different patrol routes. Each team consisted of 10 peoples, with each team member having his/her own responsibilities as Standard Operating Procedure.

Attendees were asked to evaluate the training provided in terms of how interesting they found them. 71% showed participant interest in wildlife identification and monitoring methods and the patrol management system. Anticipation and prevention of potential human-wildlife conflict, especially outside the protected area, methods devised with BKSDA South Sumatra, reinforced findings that wildlife conflict usually occurs within concession or plantation areas close to SM Dangku or REKI ecosystem restoration concession.

2.3. Community Rangers Support Unit (CRSU)

Initial actions and an important step that need to be done to establish CRSU is identified suitable candidates for CRSU in the most sensitive tiger – human conflict areas in adjacent areas of Berbak National Park. Only enthusiastic, courageous and honest rangers will recruit and provide the ranger basic training investment and incentive support scheme.

Based on the needs analysis, WCCRT require the additional support and presence of members of the local community to support the implementation of the activities carried out by WCCRT in the field. WCCRT activities that need to be supported by CRSU are public conservation outreach, community engagement, information-based intelligent back-stopping, WCCRT public relation, forest patrol and tiger-human conflict management. Through the establishment of CRSU, community participation can play a large part in the fields of forest protection (from illegal logging and fire threats), conservation and rehabilitation.

Based on the results of monitoring of tiger – human conflict over the last 2 years, WCCRT has set 6 villages the most sensitive human-tiger conflict which includes the villages of Air Hitam Laut, Rantau Rasau, Sungai Aur, Pematang Raman, Sungai Sayang and Bako Tuo. In each villages will be recruited 1 (one) community rangers members.

In the project reporting period, WCCRT has developed criteria for the recruitment of the community ranger members in the most sensitive human tiger conflict villages stated above. This criteria for selecting community rangers members includes the basic, essential and desirable skills are following:

BASIC SKILLS

- High School, preferably University (S1) degree majoring in biology, forestry or equivalent experience in a relevant field. Fresh graduates are welcome to apply
- Good physical and mental fitness to work extended periods in the field and conflict areas.
- Able to carry field equipment
- Able to work under pressure with minimum supervision
- Good knowledge and ability to work with community
- Good interpersonal skills, communication skills and pleasant personality

ESSENTIAL SKILLS

- Demonstrated interest in natural resource management, in particularly forest/ species conservation issues.
- Love to work outdoor
- Knowledge of local society and culture, language and an understanding of relevant issues in the local context, particularly local community in the village where he/she lived.
- Good interpersonal skills and ability to communicate effectively with a wide range of people.
- Demonstrate reliability and consistent performance in the workplace.
- Ability to work, within a multi-disciplinary workplace and operate effectively as a member of a collaborative team.
- Good organisational skills and ability to complete allocated tasks and responsibilities with direction.

DESIRABLE

- Experience in natural conservation activities
- Experience with operating vehicle in remote locations, including cellular phone.
- Good understanding of nature conservation issues in local context, particularly tiger issues
- Ability to use computers for basic reporting purposes.
- Ability to driving motor-cycle and or boat.
- Community leaders who are respected community
- Ability to travel, live, and work in remote locations as a regular part of the job function, and assist with extended fieldwork involving WCCRT

3. FUTURE WORK

In the following 6 months of funding the project implementation will in conjunction with the National Park staff, a site specific patrolling system and data collection designed during the training will be implemented and trailed for three months, this will be reviewed in the first focused group discussions (FGD) review meeting. Any refinements made to the design will be implemented by the WCCRT and National Park staff for review again at six and eighteen months. The outcome: a refined and tailored set of patrolling protocols implemented by WCCRT and national park staff in Berbak.

After the MIST training is complete ZSL will provide on going technical support to the WCCRT and national park ensuring issues are addressed as they arise. 2-day focused group discussions (FGD) will be conducted at intervals of three, six after implementation, to be attended by WCCRT and

national park staff. The FGD will be used to monitor the standard and effectiveness MIST implementation and will provide MIST users with a “problem solver” to ensure MIST and field data collections run smoothly. Problems will be highlighted and solutions for technical issues faced by user discussed.

Based-on criteria selection, recruitment of community rangers will ultimately be the choice of the WCCRT Manager, but as an advisor ZSL will also review candidates to assist in preventing employing poor candidates. Furthermore, salaries are kept modest so only rangers who genuinely want to join the programme are interested.

Four days training for community ranger’s member will carry out. The training agenda including WCCRT, sumatran tiger and Berbak forest conservation, communication and community conservation awareness; basic of forest patrols; basic cases investigation,; orientation and navigation ; building cooperation, creativity, confidence, motivation and commitment , and developing agreement work between WCCRT and community rangers.

After training, CRSU to undertake regular patrols. The ratio of 1 community rangers for each WCCRT member will allow each ranger to accompany one patrol every month, reducing the likelihood participation in the scheme will disturb their main occupation and increasing the possibility of recruiting suitable candidates. Each community ranger will be partnered with a WCCRT member to act as a mentor and point contact to maintain their connection to the WCCRT CRSU scheme will review at six month intervals a meeting will be held with the Heads of the BKSDA Jambi, National Park, ZSL and the WCCRT Coordinator to review the CRSU scheme.

In future project period, community awareness will conduct through produce simple posters and leaflets. Leaflets will provide information on steps livestock holders can take to reduce the impact of wildlife conflict on their cattle and further information on who to contact in the case of conflict, to be distributed at any wildlife/human conflict event.

Community awareness road show also will carry out by local NGos - Gita Buana and the WCCRT to promoting the work of the WCCRT team and CRSU. Practical demonstration of methods to reduce human wildlife conflict such as tiger scaring devices will be given. The community rangers will play an active role in the roadshows, especially during when their own village is visited.

MIST DATA FORM

1. PATROL DATA FORM

Page Of

Patrol Observations

Patrol Identification No :

	Wildlife			Illegal persons			Weapons			Gears			Camps		
	Observed	Seized	Destroyed	Observed	Seized	Destroyed	Observed	Seized	Destroyed	Observed	Seized	Destroyed	Observed	Seized	Destroyed
<i>Entry field for each observation encounter</i> Species: Alive : No..... Date Times : Waypoint no : Description:	Description: Local people..... Minority..... Burmese..... Other:..... Action taken Seen : Confronted : Warning : Contract: Arrested Description:			Heard Bearing: <input type="text"/> (degree) Distance: <input type="text"/> (meters) How many times : <input type="text"/> Automatic rifle Single action rifle Shotgun Home-made gun Unknown Other : Description :			Note: <input type="checkbox"/> Gun snare No <input type="checkbox"/> Small snare No <input type="checkbox"/> Large snare No <input type="checkbox"/> String/wire snare No <input type="checkbox"/> Pit Trap No <input type="checkbox"/> Spear No <input type="checkbox"/> Hide/Blind No <input type="checkbox"/> Fishing net No <input type="checkbox"/> Fishing rod No <input type="checkbox"/> Poison <input type="checkbox"/> Electric rod <input type="checkbox"/> Wooden stick (used for climbing tree) <input type="checkbox"/> Chainsaw <input type="checkbox"/> Handsaw <input type="checkbox"/> Axe <input type="checkbox"/> Knife <input type="checkbox"/> Car <input type="checkbox"/> Bicycle <input type="checkbox"/> Motorbike <input type="checkbox"/> Tractor <input type="checkbox"/> Boat <input type="checkbox"/> Raft <input type="checkbox"/> Other:.....			Note: <input type="checkbox"/> Occupied <input type="checkbox"/> Recently abandoned (0-2 weeks) <input type="checkbox"/> Relatively old (2-6 weeks) <input type="checkbox"/> Old, abandoned <input type="checkbox"/> Unknown <input type="checkbox"/> No. of mats/bed/hut: <input type="checkbox"/> Stakes to dry meat..... Logging Species : No. of trees : No. of logs : M ³ : Description : NTFP Species : No : Note : Description : Other signs :					
Domestic animals															
<input type="checkbox"/> Dog Track: Seen: <input type="checkbox"/> Cat Track: Seen: <input type="checkbox"/> Elephant Track: Seen: <input type="checkbox"/> Buffalo Track: Seen: <input type="checkbox"/> Cow Track: Seen: <input type="checkbox"/> Goat Track: Seen: <input type="checkbox"/> Other: Description:	Encroachment <input type="checkbox"/> Clearing <input type="checkbox"/> Cleared <input type="checkbox"/> Planted : Area (rai) : Description :			Ammunition Automatic rifle Single action rifle Shotgun Home-made gun Unknown Other : Description :											

2. CARCASS FINDING DATA FORM

Report of

Carcass Form

1. Site name

2. Date form completed

3. Recording officer

4. Carcass Carcass ID No.

(Carcass ID No. = Ca (Carcass) + Collector's initials + Collecting date + Carcass number found on that day Ex. Ca- NK -120248-1)

5. Carcass first found by (for use, if form is not being filled by original finder)

Source of Information	Patrol or Survey ID No.	Date
Routine aerial patrol		
Routine ground patrol		
Aerial wildlife survey		
Ground wildlife survey		
Antipoaching action		
Tourists		
Researchers		
Intelligence operations		
Local communities		
Other: (give details)		

6. GPS location (UTM): E: N:

7. Name of Way point

8. Name of carcass location:

9. Sector name:

10. Description of carcass location:

.....

.....

3. ECOLOGICAL FACTORS DATA FORM

Salt Lick and Other Ecological Factor Observation

Patrol Identification Number <input style="width: 200px;" type="text"/>		Reporter <input style="width: 150px;" type="text"/>		
Location	Salt Lick	Fig Tree	Tandiran	Other describe
Name of Way point Coordinates E: <input style="width: 50px;" type="text"/> N: <input style="width: 50px;" type="text"/> Forest type: Date Start time Finish time Description:	<input type="checkbox"/> Soil-based <input type="checkbox"/> Water-based Width <input style="width: 40px;" type="text"/> meter Length <input style="width: 40px;" type="text"/> meter <input type="checkbox"/> Used by wildlife please specify species presence <input type="checkbox"/> No use by wildlife <input type="checkbox"/> Abandon and dry out <input type="checkbox"/> Old animal track/sign > 2 month <input type="checkbox"/> Other, specify	<input type="checkbox"/> Fruiting and riped <input type="checkbox"/> No fruit <input type="checkbox"/> Fruiting but not riped Specify wildlife track/sign found around the tree: Note:	<input type="checkbox"/> Active bee hives <input style="width: 40px;" type="text"/> hives <input type="checkbox"/> Abandon bee hives <input style="width: 40px;" type="text"/> hives <input type="checkbox"/> No bee hives <input type="checkbox"/> Use sign <input type="checkbox"/> Bears <input type="checkbox"/> Honey collector <input type="checkbox"/> Other, specify :	

4. PATROL DATA MOVEMENTS

Patrol Movements

Patrol Identification Number Use: Site code + start date (day/month/year) + leader's code

Reporter

Date	Way point	Time	Way point Type	Patrol transport	Coordinate	Observation	Observation Wildlifes								Observation			Observation Humans activity	
							Zibzar	Elephant	Gaur	Banteng	Muntjac	Sambar	Wild Fig	Tapir	Adult		Juvenile		Unknown
															M	F			
			SP	STOP	F	E:	ⓐ											Observation form p. ()	
				OBS			A	N:	ⓑ										
			START	O		ⓒ													Ecological factor p. ()
			POS			B		ⓓ											Tiger p. ()
			NPL	E				ⓔ											
						R		ⓕ											

5. PATROL NOTES

Notes: Feces ID No. = Scat+Collector's initials+Collecting date+Scat number collected on that day Ex. Sc-NK-120248-1

Track ID No. = Track+Collector's initials+Collecting date+Track number recorded on that day Ex. Tr-NK-120248-1

Carcass/Kills = Carcass+Collector's initials+Collecting date+Carcass number found on that day Ex. Ca-NK-120248-1

<p>Type of waypoint</p> <p>SP = Start point</p> <p>STOP = Stop patrol</p> <p>START = Start patrol</p> <p>OBS = Observation</p> <p>TRACK = Record track point every 30 min</p> <p>NPL = New Patrol Leg</p> <p>EP = End point</p>	<p>Patrol transport</p> <p>A = Aerial</p> <p>O = Observation Point</p> <p>V = Vehicle</p> <p>E = Elephant</p> <p>R = Raft</p> <p>F = Foot</p> <p>B = Boat</p>
<p>Observation Wildlife</p> <p>M = Male</p> <p>F = Female</p>	

Note

1. For a change in reporter, in the patrol number of people or a significant change in transport type, start a new line, enter NPL (New Patrol Leg) in the waypoint type column and describe the change in the notes column. The stop/start procedure should also be used for important changes in activity during the patrol (stopping for overnight camp, lunch rest etc)
2. In the case of tiger and elephant, special form should be filled in and the reference number should be given in the notes column on this form
3. T=Track/Sign H=Heard S=Seen C=Carcass F=feces
4. OBS = wildlife observation OBS = Carcass observation OBS = Patrol observation OBS = Tiger report OBS = Ecological factor
5. Wildlife observation M = Male F = Female
6. Human activity Hunting Fishing Land encroachment NTFP

6. PATROL REPORT

PATROL IDENTIFICATION NUMBER:

Patrol Report

Patrol Authorization

1. Site Name

2. Reporting officer

3. Name and rank of patrol leader

4. Patrol transport

Aerial Boat Raft Foot Elephant Observation Point

Vehicle Other, specify

5. Patrol area

6. Original purpose/types of patrol

General patrol Investigation Solving encroachment problem Monitoring

Maintenance Problem animal control Research Ambush

Other, specify

7. Specific patrol objectives

8. Start date of patrol Start Coordinate(UTM)

9. End date of patrol End Coordinate (UTM)

10. Number of persons in patrol

Name	Organization	Armed
Total		

Name and signature of Authorizing officer

Name and signature of Patrol leader

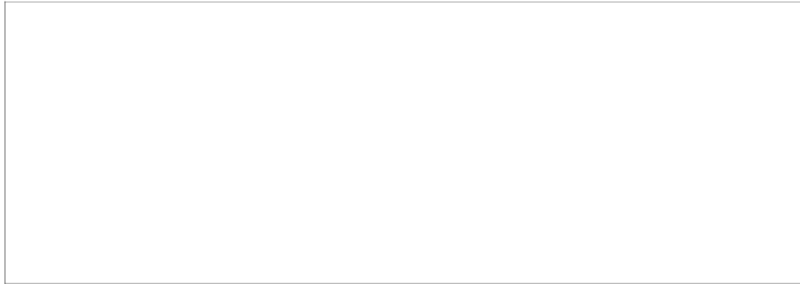
.....

.....

7. DEBRIEFING SUMMARY RESULT

DEBRIEFING: SUMMARY AND RESULTS

1. Number of patrol hours and distance patrolled: _____
2. Sectors/ area patrolled:
-
3. Draw route of patrol and mark incidents on map(s)



4. Attach completed daily patrol movement form/s.
Number of pages: _____
5. Attach completed observation form/s.
Number of pages: _____
6. Attach completed salt lick and other ecological factor observation form/s
Number of pages: _____
7. Attach completed live animal observation form/s
Number of pages: _____
8. Attach completed carcass report/s:
Number of pages: _____
9. Attach completed tiger survey form/s:
Number of pages: _____
10. Additional notes:
.....
.....
.....

8. TIGER DATA FORM

Page of

Tiger Survey

Patrol Identification Number

Reporter Forest type

Coordinates		Track												
		Front foot						Hind foot						
		Left			Right			Left			Right			
E	N	Length (cm)	Width (cm)	Paw width (cm)	Length (cm)	Width (cm)	Paw width (cm)	Length (cm)	Width (cm)	Paw width (cm)	Length (cm)	Width (cm)	Paw width (cm)	
Name of Way point:														
Description:		With/ Without cub	Scrapes		Kills/Carcass eaten		Claw sharpened mark	Feces		Spray				
			Length (cm)	Width (cm)	By tiger/leopard/ unknown	Prey Species		Old/ New	Feces ID No.	No.	At	Height from ground (m)		
		Heard	Seen			Behavior		Carcass ID No.	Track ID No.	Notes:				
No. of Individual	time:	Adult/ Sex	Juvenile /sex	Cub/ Sex	Time									



21ST CENTURY TIGER
giving wild tigers a future

WILDLIFE CRIME AND DETECTION IN BERBAK

Maintaining and Promoting Wildlife Crime Action
Network in Berbak National Park

Final Report to 21st Century Tiger

Erwin A Perbatakusuma, Laura D'Arcy, Nurazman, Dolly Priatna,
Barita O Manullang and Mulya Shakti

APRIL, 2012

A. Executive Summary

The Wildlife Conflict and Crime Response Team (WCCRT), formerly known as the “Unit Penanggulangan Konflik dan Kejahatan Lingkungan” (UPKKL), has been designed to deal with tiger poaching, illegal trading and other human-wildlife conflict in the Berbak Ecosystem, Province of Jambi, Sumatra. It is a multi-stakeholder unit that has now consolidated its position within Jambi by establishing a stronger legal basis, under a Memorandum of Understanding that now exists between ZSL Indonesia and the Natural Resources Conservation Agency (BKSDA) Jambi. This MoU was further supported by the issue of a Decree from the Head of BKSDA to the various Department heads of each team member. This has cemented the role of the team and promoted joined-up management of the team. This will further elevate the position of the WCCRT politically with other groups involved in dealing with human-wildlife conflict and environmental crime issues in Jambi Province.

Between 2011 and 2012, the WCCRT was informed of, monitored and responded to 13 cases of human wildlife conflict in Jambi Province, 8 of which (61 percent) were related to tiger-human conflict, an increase on last year which may be related to the effects of the summer forest fires on prey density, resulting in the tigers being forced to travel further to hunt.

It is clear that if threats to the tiger population in and around Berbak National Park such as poaching and human conflict do not continue to be addressed, then long term plans to protect and conserve the national park through REDD financing could potentially be for a forest empty of tigers. Tiger-human conflict that occurred this year has led to the death of 3 tigers by high-voltage electric fences set up to protect community-owned plantations and 1 death from an incidental snaring. As a result, the WCCRT have begun to work on a policy level to try to design new laws to prevent the use of these fences, working with the farmers to develop a program of tiger-friendly farming practices and land use management to prevent further loss of the tiger from its habitat.

In this reporting period, the WCCRT has been informed of and dealt with 9 cases of wildlife-human conflict involving Sumatran tigers. They have demonstrated their abilities as a rapid response team, investigating the causes of these conflicts and taking steps to mitigate and resolve any further human-wildlife conflicts.

B. Current Status of Work

1. Strengthening Support for the Wildlife Conflict and Crime Response Team

During the 'Conflict Management Unit and Environmental Crime (UPPKL)' first year of operation in Berbak Ecosystem in 2010, it worked as an informal multi-stakeholder-based team with each of the members having individual legal status to conduct wildlife conflict and crime activities. In order to strengthen the legal aspects of the Wildlife Conflict and Crime Response Team (WCCRT), on the 23 August 2011 a Memorandum of Understanding was signed between the Head of BKSDA (Natural Resources Conservation Agency) for Jambi Province, Ir. Tri Siswo Rahardjo M. Si and Dolly Priatna M. Si representing the Zoological Society of London, Indonesia Programme regarding the implementation of the Wildlife Conflict and Crime Response Team (WCCRT). This legal recognition of the WCCRT as an entity is essential to promoting the smooth operation of the team in the field and to increase the support for team members in undertaking their roles in the WCCRT. This MoU also strengthens the position of WCCRT with other parties that deal with the management of wildlife conflicts.

The Memorandum of Understanding states the scope of cooperation between the two parties (BKSDA Jambi and ZSL) in the implementation of Wildlife Conflict and Crime Response Team, including the following aspects:

- a) Implementation of WCCRT operational activities carried out in the Berbak Ecosystem and Jambi Province;
- b) Developing a system to address wildlife conflicts and other environmental crimes, especially in the Berbak Ecosystem;
- c) The design and implementation of a pilot project for creating a "Conservation-friendly Electric Fencing System" to create a way in which farmers can protect their crops from raiding pigs but at the same time minimise potential risk to wildlife, especially the Sumatran tiger;
- d) To address the capacity building of all members who joined the WCCRT through training related to wildlife conflict field operations;
- e) Development of a MIST (*Management Information System for Tigers*) database management system to process and analyse data resulting from patrol work.

At the national policy level, this Memorandum of Understanding is legally supported by Ministry of Forestry Regulation No. 48/ 2008 on Guidelines for Wildlife Conflict Management.

This MoU was followed up in early October 2011 by a Decree from the Head of the BKSDA Jambi concerning 'The Assignment of Personnel to the Wildlife Conflict and Crime Response Team'

The authority, responsibilities and duties of the WCCRT under the Decree are as follows:

- a) To fall under the overall responsibility of the Head of the Natural Resources Conservation Agency Jambi Province;
- b) To coordinate the cooperation of wildlife conflict management between the WCCRT and relevant institutions;
- c) Provisioning the WCCRT with training related to wildlife conflict and investigation capacities, particularly the Sumatran tiger;

- d) Preparing Standard Operating Procedures (SOP) documents for tiger handling operations in human-tiger conflict situations, which include inspection and risk assessment of human-tiger conflict, flow and analysis of information, victim compensation, legal process, procedures for handling conflict and wildlife conflict handling equipment and supplies;
- e) To manage a database of environmental crime and wildlife conflict handling, particularly the Sumatran tiger, using Data Base System - MIST (Management Information System for Tigers);
- f) To respond to and follow up rapidly on wildlife conflict in the Berbak Ecosystem and surrounding areas;
- g) To create and strengthen the function of local-level intelligence information networks throughout the Berbak ecosystem;
- h) To promote and implement a pilot project for ' low voltage and wildlife conservation-human friendly electric fence' to reduce or stop the wildlife conflict in agricultural areas, particularly for the Sumatran tiger;
- i) To undertake regular forest patrolling in areas vulnerable to wildlife conflicts and potential threats
- j) To develop campaign materials on the existence and work results of the WCCRT to disseminate to the general public;
- k) To investigate wildlife crime, particularly involving the Sumatran tiger;
- l) To coordinate with the relevant parties in response to information about environmental crime that is received during the period of the project;
- m) To coordinate with other organisations dealing with wildlife conflict management operations.



Picture 1. WCCRT Team members: (clockwise from left sitting) Sartono, Heva Edison, Havis Badaruddin, Mahfuddin and Ade Irawan (members); Nurazman (lead).

2. WCCRT Response to Wildlife Conflicts

From February 2011 to the second reporting period, the WCCRT has handled nine cases of wildlife conflict. The activities involved in handling these cases are described below chronologically.

February 2011

On 5th February 2011, the WCCRT attended a case where human victims were/ preyed upon Sumatran tigers in the Sungai Gelam Village Muaro Jambi District. The village is bordered by a single Acacia Timber Forest Plantation with several other companies working in Bayung Lincir, South Sumatra Province.

The WCCRT Team found that on Wednesday February 2nd 2011 a 52-year-old man (a forestry worker) was killed by a Sumatran tiger. Eye witnesses who saw the incident said that the tiger appeared, frightening the victim so he ran away from the tiger. The tiger pursued the victim and pounced on him killing him. Once dead the victim was mauled by the tiger. The incident happened across the River Pering in a timber logging concession. Local residents said that people have regularly observed the presence of tigers here but few of these sightings were reported. In January 2011, at least three encounters occurred with an adult tiger and two juvenile tigers seen together, passing around the village and surrounding agricultural areas.

In response to this incident and the subsequent stories in the local press on 10th February, the WCCRT and BKSDA Jambi facilitated a wildlife conflict prevention event to the public in Jambi. The purpose of the event was to convey information about human wildlife conflict, highlighting to the wider community that this conflict was being addressed and to improve the reliability of information on how to deal with human wildlife conflict thus reducing sensationalist press stories. Participants who attended the event included journalists from the press and electronic media, international and local NGOs and local government.

The conclusions of the meeting and discussion forum were as follows:

1. The main cause of human wildlife conflict is the loss of natural habitat for the tiger and other wildlife species for foraging, shelter and mating. In Jambi Province, the key drivers of human wildlife conflicts are Illegal logging, forest fire, forest encroachment and forest area conversion to subsistence and commercial agriculture both legal and illegal.
2. Steps need to be taken to address proactively the destruction and deforestation of natural forest. Solutions proposed included construction of Wildlife Corridors to link forest areas through production landscape such as palm oil concessions, logging concessions and timber plantations; improved law enforcement; increased forest fire prevention and local community participation in forest and wildlife conservation.

On 22ND February 2011, the WCCRT received a report that a tiger had died in the Air Hitam Laut Village, Tanjung Jabung Timur District, on the east coast of Berbak National Park. The tiger death, which occurred on 16th February, was a direct result of the tiger being electrocuted by a high-voltage electric wire fence erected in the plantation area owned by local residents.

As with other villages in the area, Air Hitam Laut is heavily reliant on agriculture, including small scale palm oil and coconut plantation, so to protect their crops from pests such as wild

pigs a 1,500 watt high-voltage electrical wire fence was erected to deter or kill these pests. This form of deterrent is extremely dangerous, for both humans and wildlife.

Electrified fences are increasingly being used by farmers in the Sadu District to prevent attacks on their crops by pigs and other wildlife pests. The tiger that was killed was identified as an adolescent male, approximately 7-years-old and weighing 70 kg. Death was instantaneous from the electric shock received from the fence. This incident was the first of its kind and, due to the villagers in Air Hitam Laut being aware of the penalties relating to tiger deaths from previous work with ZSL, the farmer tried to dispose of the corpse. Other villagers informed the WCCRT hotline about what had happened.

On attending the scene the WCCRT found tiger bones scattered across the field showing evidence of predation on some of the tiger bones by lizards (Biawak). The main body of the tiger had been burnt and left exposed in the field. This resulted in members of the community collecting body parts from the remains, especially sections of the skin. Many of the tiger bones were not found by WCCRT, including the tiger's head.

After conducting an in-depth investigation, the missing tiger body parts were collected from the village including the head of the tiger which was buried under the house of the farmer whose fence resulted in the tiger's death.



Picture 3. The WCCRT collecting field evidence of a tiger killed by a high-voltage electric fence.

March 2011

On 28th March 2011, the WCCRT responded to a second human wildlife conflict again in the



Air Hitam Laut Village, Sadu Sub district. A second juvenile male Sumatran tiger had been killed by a high-voltage electric fence in an agricultural area owned by local residents. As a result of the socialisation activities after the first killing, the WCCRT were immediately informed of the second incident. WCCRT personnel then removed the tiger to the Animal Laboratory in Jambi for an autopsy to confirm the cause of death. Laboratory results confirmed that the Sumatran tiger was killed by electrocution

Picture 2. Sumatran tiger killed by 1500 watt high-voltage electric fence in a community agricultural area.

Photos and evidence from the lab allowed ZSL's Field Survey Coordinator and Tiger Officer to confirm that the dead tiger was a 4 year old male tiger, 'King Arthur'. This young tiger was one of the first tigers to be captured by ZSL's long term tiger monitoring camera traps in Berbak National Park in June 2010. Video footage also recorded this young male hunting.



Since the tragic loss of these two young tigers the WCCRT has met with local resident to discuss alternative methods of pest control to avoid similar incidents in the future. Local residents claimed that the use of high-voltage electric fence is the most cost effective and successful method and currently there is no alternative way to prevent pigs and other pests attacking their crops.

Although only in use for the last 12 months, high-voltage fence is rapidly being adopted by farmers in Air Hitam Laut Village and by others in nearby villages experiencing similar problems with wild pigs. High-voltage fences kill about 50 pigs/week. The meeting recorded a total of 13 farmers in Air Hitam Laut Village using these high-voltage electric fences.



Picture 4. The WCCRT found parts of a Sumatran tiger which had been killed by electric fence, including head, teeth, skin pieces, bones.

The WCCRT, Berbak National Park Office and local community representatives in the meeting agreed to investigate further and to promote implementation of new methods of preventing human-tiger conflict such as the installation of low-voltage and wildlife conservation and human friendly electric fence. This electric fence has a pulsed electrical charge and only shocks the pigs; it does not kill them. Therefore, if the wire comes into contact with wildlife or humans the contact will be unpleasant, but will not injure or cause fatalities for most wildlife. This method is quite effective, and less harmful to humans and wildlife.

These cases have clearly demonstrated the need for further community conservation awareness activities to socialise and implement a pilot project for 'wildlife conservation friendly electrical fence' and to address the issue of minimising the use of high-voltage fencing while at the same time reducing human-tiger conflict in community agricultural areas. Sadly, only a week after this meeting a local mother and daughter were walking in the fields and also received fatal injuries from coming into contact with these fences.

April and May 2011

As well as patrolling activities, the WCCRT responded to a report from a company on the presence of a tiger in their oil palm concession, adjacent to the Grand Forest Park in Mekar Sari Village, Kumpeh Ulu District. On 28th March 2011 a harvester saw a tiger running in the oil palm. On 29th March another female farm woman worker had a direct sighting of an adolescent tiger, when she was clearing in the oil palm plantation.



Picture 5. A community meeting in Air Hitam Laut Village to discuss for resolve human-tiger conflicts

Tiger sightings were also reported in another concession between 30th April and 3rd May, in Puding Village, Muara Jambi Sub-district. Located only 4 km from Berbak National Park, the concession has been operating since 2004. The concession boundary meets a neighbouring concession, where 'Salma' an alleged conflict tiger and man killer was caught in 2009. Tiger pug marks are still regularly seen in this area.

As a result of this continued and high level of presence, the likelihood of tiger-human conflict is high so, in anticipation of this, the WCCRT recommended to the plantation owners that an awareness campaign be started. This would socialise human-tiger conflict management to employees, increasing awareness and alerting employees on how to mitigate or respond to human-tiger conflicts.

The WCCRT concluded that it is highly likely that the tigers are coming from Berbak National Park, as the high rainfall and flooding in the swamp forest in the park may have resulted in reduced hunting capabilities for the tigers in the park. This lack of resource availability may have caused tigers to move towards the palm oil plantation, to forage on the drier land of the concession.

Another WCCRT conclusion was that facilitating the involvement of the private sector, as well as the local community in human-tiger conflict prevention is essential, since many conflicts occur close to plantations, mining concessions and agricultural land as well as close to human settlements.



Picture 6. Investigation of tiger movements in villages bordering the park.

June 2011

The WCCRT attended no incidents of wildlife conflict but undertook regular patrolling activities in the National Park.

July 2011

On 14th to 16th July 2011, the WCCRT conducted human-tiger conflict management socialisation with palm oil plantation workers from plantations located near conservation areas such as Berbak National Park and Tanjung Grand Forest Park. , Wildlife species are often seen in palm oil plantations, including tigers and sunbears. Agricultural workers are very vulnerable to becoming victims of human-tiger conflict and there is a high probability that they will encounter a tiger in the company concession area.



In the socialisation meeting, the field employees gained understanding about tiger and bear behaviour, ways of determining and differentiating animal footprints, methods to avoid conflict and procedures that be must followed in

the case of coming into contact with a tiger.

August and September 2011

From mid-August until 22nd September 2011, all members of the WCCRT joined forces with fire fighting activities in the forested areas in Jambi Province, including key tiger habitat areas in Berbak National Park.



Forest fire in Jambi Province. All members of WCCRT combated forest fires in key tiger habitat, particularly in Berbak National Park.

The wild fires surrounded one of Sumatra's key tiger habitats in Berbak National Park, Jambi, Sumatra, during August and September. They began with first hotspot being recorded on 15th August 2011 in a small, provincially protected conservation area called Grand Forest Area (TAHURA), situated in the Sempojen Area on the western border of the national park. In September, the forest fires included three hotspot locations inside Berbak National Park, including Rantau Rasau Area, Cemara Area and an area already burnt by forest fire in 2007. However, fighting fires in and around Berbak was not as straight forward as other fires as the fighters had to deal with mostly peat fires. BKSDA Jambi Province, Berbak National Park Agency and community-based dedicated fires fighting team were on site and continued to fight the fires.

Peat fires do not burn like other forest fires. While trees and lianas provide most of the fuel for other forest fires, in peat forests the peat itself burns with the fire moving underneath the forest and deep underground making it extremely difficult to extinguish. Underground fires make it very hard to predict where the fire is moving, often with fires reappearing on the surface hundreds of meters away from the original fire hotspot. The combination of these factors makes peat fires one of the most difficult types of fire to combat, often resulting in them burning out of control for several months. Fire fighting through the spraying water over the surface is less effective, because fire fighting must ideally be done through injection of water deep into the peat soil to reach the smouldering fire.

The central government provided support by seeding clouds to create artificial rain in Jambi Province for 2 days. It also funded and deployed helicopters to drop water bombs on the burning forest. This rapid assistance by central government was carried out concurrently with the working visit of the President of the Republic of Indonesia to the province on 22nd to 24th September. Three fire fighting teams were set up with funding raised by the ZSL/21st Century Tiger Fire Appeal. Team members included national park officials, community-based fire fighters and ZSL staff and they monitored and successfully extinguished the fire which was in a remote location deep within the park.

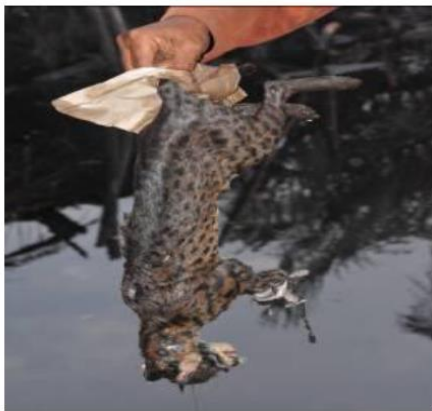
There were a total of 961 fire hot spots in Jambi Province. While less than neighbouring provinces such as Riau and South Sumatra, the main focus of the Jambi fires was in the area closest to Berbak National Park. The WCCRT, led by Mr. Nurazman, conducted monitoring of forest fires and their impact on wildlife in mid-September.

WCCRT post-fire monitoring activities focused on areas around known tiger habitats in Berbak National Park and in potential wildlife-human conflict areas, i.e. in palm oil plantations, ex-timber concessions and Rantau Rasau Village. More than a thousand hectares of land were burned in a short time period. The team reported that the underlying causes of the forest fires were the long dry season and the culture of local people using slash and burn practices to open up agricultural land.

Prior to these occurrence of forest fires, while monitoring these locations the WCCRT often encountered wildlife species such as Sumatran tigers, leopard cat, clouded leopard and sun bear, through direct encounters, footprints or faeces. The ex-timber concession was the location where female tiger "SALMA" was captured in 2009. Tiger habitat conditions in the area were destroyed by wild fire, except where the concession borders with palm oil concession where roads and canals form a fire break.



Picture 8. Forest fire area during September 2011, include sumatran Tiger Habitat in palm oil concession



Picture 9. Member of WCCRT has found a leopard cat in the region where the Sumatran tiger habitat area was burned. This species is found dead and floating in a canal in the palm oil concession

Three sites were surveyed located at a range of 8-14 km from Berbak National Park this was estimated to be the approximated distance a Sumatran tiger is able to move quickly when trying to avoid the fires. This was to determine if any Sumatran tigers had been trapped by the fires and subsequently injured or killed. The team discovered the remains of a leopard cat or "Kucing Akar" (*Prionailurus bagelensis*) floating in the canal, which had been subject to such a fate. There have been concerns raised about the resulting long term damage that may have occurred to respiratory system of large wildlife, which may impair them well into the future after the fires have been extinguished.

October 2011

Results of WCCRT monitoring determined that forest fires in wildlife-rich areas can increase the incidence of wildlife-human conflict, particularly with the Sumatran tiger, directly due to the loss of habitat. It was proposed that more research needs to be done in locations already affected by fires, to look for evidence that wildlife species had been burned to death, especially the Sumatran tiger. The WCCRT again stressed the importance of cooperation with the private sector and local community to participate in post-fire conflict prevention activities in Sumatran tiger habitat.

November 2011



The WCCRT conducted jungle patrols around Rantau Rasau village. There were no indications of potential tiger-human conflict and no reports of villagers or livestock having been victims of tiger conflict. No tiger traces were found in the vicinity of the community farm.

However, villagers did report that, in the event of heavy rainfall and flooding in the forest, tigers will come out of the forest area to get easier access to their prey.

December 2011

The WCCRT conducted a ground truthing visit to Petaling village, Sungai Gelam Sub-District. This was in response to reports by state-owned oil company PT. Pertamina concerning the presence of Sumatran tiger in its oil drilling concession. Sungai Gelam has had a high incidence of wildlife conflict, especially with tigers, the peak of which occurred between late 2008 and April 2009 when 9 people were killed by a tiger. A primary cause of this conflict was the rise in sea level due to coastal erosion and inundation of farmers' fields, which compelled the tiger to move towards settlements and palm oil plantations which were drier than their swamp forest habitat. In addition, tiger habitat in the area had been decimated by illegal logging and forest conversion to oil palm plantations.

WCCRT monitoring, found evidence that a female tigers and her 2 cubs were living in an oil drilling site next to Petaling village. This location is very close to residential areas, schools and public roads, making it very dangerous for the surrounding community, workers and for the tigers themselves. WCCRT warned all villagers and employees to be careful when performing daily activities in the field.

January 2012

The WCCRT continued to survey the area, collect additional information about the tiger and her cubs. The tigers remained undisturbed by the villagers and no human tiger conflict occurred. Further socialisation and training was given to those villagers who keep livestock. Instructions on how to construct wildlife scaring devices were given.

February 2012

The WCCRT investigated a tiger death that occurred in Simpang Gajah, an area located inside Berbak National Park about 150m from the Air Hitam River. The highly decomposed remains, including the hide and bones, were found by the ZSL and WCCRT Survey Team when they were

placing camera traps in the forest near a popular pathway used by hunters targeting tiger prey species such as deer. The snare, which had been set by these hunters for larger deer, snared the tiger around the left paw. The tiger had been unable to break itself free and most likely, judging from the scratch marks on the tree, died from dehydration and exhaustion.

The team found a snare and hunters' shelters and estimated that the trap had been installed 1 month previously. The WCCRT removed the carcass and conserved parts of the tiger's body as evidence. The WCCRT formed an investigative team to find the suspects and remove all remaining snares, including the small mammal traps that were also found.



Picture 11. WCCRT and ZSL Survey Team discovered and removed remaining tiger snares found inside the national park forest.

This case highlighted that at the moment the park is still very much under protected and there is a need to increase forest patrol activities in Berbak National Park to prevent hunters to moving freely through the park to set up their snares. It was proposed that the most vulnerable areas of the park boundary need to be identified and more guard posts need to be set up and manned.

March 2012

On 30 March 2012, tiger-human conflict occurred in Air Hitam village, located adjacent to Berbak National Park. The incident occurred in a palm oil plantation owned by local residents, where again high-voltage electrical fencing was being used to deter pigs. This incident led to the death of a female tiger named 'Mahadewi' – another tiger well documented by the ZSL monitoring team.

Air Hitam village seems to provide habitat that the tigers from the National Park visit regularly, as the 2 adult tigers killed by high-voltage electric fence in 2011 were close to the same area. Efforts had been made in the past to speak to the community and coordinate with local police to discuss the dangers of this fencing and to highlight the tragic case of a human mother and daughter also killed by these fences. Villagers agreed that high-voltage fencing is dangerous but, due to the increase in the price of palm oil and the number of pests in Berbak, they began again to install high-voltage electric fence to protect their agricultural land.

WCCRT personnel took the tiger Mahadewi's carcass to the Animal Laboratory in Jambi for autopsy. Laboratory results confirmed that the tiger had been killed by electrocution from the high-voltage fencing.

The WCCRT immediately coordinated with the local Government of West Tanjung Jabung District to develop regulatory policies for the use of electrified fence to protect agricultural land from pests. They have also begun to coordinate much more closely with the local police enforcement efforts

related to this case. However, to date, the appropriate articles of legislation have not been identified. WCCRT and the Regional Police Office have been investigating the crime which will be reported to the higher authorities (Ministry of Forestry, Provincial Police Office, and the Governor of Jambi), so the seriousness of this continued practice becomes a major, high-priority concern which must be dealt with.

Alternatives are being explored but currently none so far seem to be as cheap or as effective a deterrent as these fences, so while alternatives are slow to arrive, it was decided to focus on presenting a stronger disincentive to the communities. Between 13-15 March 2012, an integrated team consisting of WCCRT, Regional Police Office, Berbak National Park and the Nature Conservation Resources Agency conducted a crime scene investigation at the site. Follow-up efforts by the Regional Provincial Police included writing an investigation report letter, confiscating evidence and summoning witnesses for questioning.

After discussion and reviewing the findings it was determined that the next step should be to bring a lawsuit against the suspect, prosecuted by Berbak National Park Office, the Nature Resources Conservation Agency (BKSDA), the WCCRT and Regional Police Office. Taking this high-profile case to court is expected to raise awareness across the community that causing the death of a tiger with high-voltage electric fence is illegal and that there will be legal consequences.

3. Develop and Review Standard Operating Procedure for WCCRT

A Standard Operating Procedure (SOP) document for WCCRT was created, reviewed and produced based on lessons learned and the experience to date of WCCRT in the implementation of human-wildlife conflict management.

This SOP is expected to increase WCCRT capacity for dealing with tiger-human conflict in a professional and effective manner.

The SOP explains comprehensively all aspects of inspection and risk assessment of human-tiger conflict, flow and analysis of information, database management, victim compensation and legal process, procedures for handling conflict and wildlife conflict handling equipment and supplies. See Annex 2 for more detail.

4. Concluding Remarks

During this phase of the project, the WCCRT has demonstrated increased capacity to cope with tiger-human conflict. This is evidenced by the high level of response to problems and conflict situations as they have arisen. Overall, both stakeholder and community responses to the WCCRT unit have been very positive and the goals which were set out during the grant period have been achieved to the best of the unit's capabilities. The capacity and skills to deal with wildlife crime detection and prosecution are steadily being built on as the trust between the communities and the unit continues to develop.

The WCCRT is widely respected by the public in Jambi for its dedication and capacity in resolving wildlife conflict and crime - a reputation which the unit will continue to build upon. Capacity areas identified as strengths of the WCCRT were:

1. Rapid response to reports of wildlife crime and conflict in communities; communities felt supported.
2. Strong relationships built with communities and the private sector by frequent visits and follow up after conflict events.
3. Increased conservation awareness in communities and local government of the protected status of the Sumatran tiger.
4. Increased WCCRT capabilities in handling tiger-human conflict practically and in conjunction with law enforcement agencies.

Capacity areas where it was felt that the team needed to improve were:

1. Time and resources management, balancing official work commitments and commitment to the WCCRT.
2. Further strengthen relationships and trust with communities, particularly in potentially sensitive issues associated with wildlife crime and conflict, as there is still some reluctance to contact or work with the team; develop tiger conservation orientated community-based program.
3. Increase coverage and frequency of forest patrols within the National Park boundaries, private sector concession areas and community farm areas.

The recent tiger deaths highlight that the WCCRT needs a long-term and comprehensive development program to protect tigers and their habitat, ideally in tandem with a wider education project involving communities. The program needs to be developed, not only to respond during or after a conflict has occurred causing losses to both tiger and human, but also to be able to detect potential sources of conflicts early through intensive regular forest patrols, tiger conservation outreach to the local community and providing practical and appropriate solutions, especially to communities around the most sensitive tiger-human conflict areas. Tiger deaths in agricultural areas indicate that the WCCRT need to develop a program of tiger-friendly agricultural farming practices and land use to resolve the key cause of recent tiger losses to the population of Berbak and Jambi.

APPENDIX 1

TABLE 1. HUMAN – ENDANGERED SPECIES WILDLIFE CONFLICT IN JAMBI PROVINCE (JANUARY – SEPTEMBER 2011)

NO.	ANIMAL SPECIES	LOCATION	DATE	WILDLIFE CONFLICT DESCRIPTION	FOLLOW-UP EFFORT TO ADDRESS HUMAN-WILDLIFE CONFLICTS
1	Sumatran Tiger	Air Hitam Laut Village, Tanjabtim District	16 February 2011	Tiger died by high-voltage electric fence.	Ground checks, evacuated carcass and conserved part of tiger body, took geographical coordinate point and documentation of evidence. Proposal to implement 'low voltage and wildlife-human friendly electric fence' in agricultural areas. Tiger monitoring by camera traps in agricultural areas.
2	Estuarine Crocodile	Muara Danau Village, Merlung District	21 February 2011	Crocodile entered residential area in Muara Danau Village.	Ground checks, took geographical coordinate point and documentation of evidence. Planning and proposal for establishment of protected essential ecosystem areas.
3	Asian Elephant	Palm Oil Plantation Bungo District	16 March 2011	Elephant entered palm oil plantation.	Chasing and coordination with local government.
4	Sumatran Tiger	Air Hitam Laut Village, Tanjabtim District	21 March 2011	Tiger died by high-voltage electric fence.	Ground checks, evacuated carcass, <i>visum et repertum</i> , and conserved tiger body which was still intact, took geographical coordinate point and documentation of evidence. Tiger remains entrusted to and secured in Berbak National Park office. Proposal to implement 'low voltage and wildlife-human friendly electric fence' in agriculture areas. Tiger monitoring by camera trap in agriculture area
5	Malayan Bear	Lubuk Kambing Village, Merlung District	28 March 2011	1 local resident injured. Bear pursued resident.	Ground checks, but no victim was found. Urged residents not to go into the garden alone.
6	Leopard Cat	Sungai tering Village, Tanjabtim District	1 April 2011	Cub born near a residential settlement.	Chasing and urged residents to take care.
7	Sumatran Tiger	Oil Plantation, Muara Jambi District	1 April 2011	Tiger entered palm oil plantation.	Ground checks, tiger footprint exploring, took GPS reference, documentation of evidence. Human-tiger conflict socialisation meeting with company employees and urged employees to be vigilant when working.

8	Sumatran Tiger	Palm Oil Plantation. Kertapersada	1 May 2011	Tiger entered palm oil plantation	Ground checks, tiger footprint exploring, took GPS reference, documentation of evidence. Human-tiger conflict socialisation meeting with company employees and urged employees to be vigilant when working.
9	Sumatran Tiger	Palm Oil Plantation. Kertapersada	1 May 2011	Tiger entered palm oil plantation.	Ground checks, tiger footprint exploring, take GPS reference, documentation of evidence. Human-tiger conflict socialization meeting with company employee and for workers to be vigilant when working
10	Sumatran Tiger	Oil drilling areas of PERTAMINA (state owned oil company) in Sungai Gelam and near settlement areas, Muaro Jambi District	29 December 2011	Female and cub Sumatran tigers entered the oil drilling area.	Ground truthing, searched tiger tract to find evidence tiger presence, recorded geographical coordinate point and documented evidence. Held human-tiger conflict socialisation meeting with PERTAMINA employees and the local community to urge all to take a care when working in the field. Developed an information monitoring system for checking tiger presence in the area.
11.	Sumatran Tiger	Community-owned rubber plantation, Merangin District	January – February 2012	2 local residents injured and 1 hunting dog killed.	Ground truthing, searched tiger tract to find evidence of tiger presence, recorded geographical coordinate point, documented evidence, set up local task force, installed camera traps to monitor tiger presence. Held human-tiger conflict socialisation meeting with local community and urged all to take a care when in their plantation.
12	Sumatran Tiger	Berbak National Park Forest, Tanjabtim Timur District	15 February 2012	1 tiger killed by a snare.	Ground truthing, removed the carcass and conserved part of the tiger's body. Recorded geographical coordinate point and documented evidence. Formed an investigation team to find the suspects and remove remaining snares.
13	Sumatran Tiger	Community-owned palm oil plantation, Air Hitam Laut village, Tanjabtim District	30 March 2012	1 female tiger electrocuted by high-voltage electric fence.	Ground checks and removed carcass, visum et repertum, and conserved the tiger's body which was still intact. Recorded geographical coordinate point. Crime scene investigation involving Regional Police to bring this case into the legal system, to act as a deterrent to other people who use high-voltage electric fence to protect their gardens from pests, especially pigs.

LAMPORAN 10



GUBERNUR JAMBI

Jalan Jenderal A. Yani No. 01 Jambi

KEPUTUSAN GUBERNUR JAMBI

NOMOR 352 / KEP.GUB/ SETDA.EKBANG&SDA-4.2/2013

TENTANG

STRATEGI DAN RENCANA AKSI PROVINSI REDD+
(REDUCING EMISSION FROM DEFORESTATION AND FOREST DEGRADATION PLUS)
PROVINSI JAMBI TAHUN 2012 - 2032

GUBERNUR JAMBI,

- Menimbang :
- a. bahwa Provinsi Jambi sangat rentan terhadap dampak dari perubahan iklim, dan disisi lain sektor kehutanan serta lahan gambut memiliki peranan strategis secara global sebagai bagian dari struktur provinsi yang masih mempunyai hutan tropis dan lahan gambut dengan fungsi penyerap Gas Rumah Kaca (GRK) yang besar;
 - b. bahwa masalah deforestasi dan degradasi hutan berikutan dampak emisi GRK di Provinsi Jambi berkontribusi terhadap pemanasan iklim global dan kehidupan manusia, emisi karbon akan meningkat di masa depan dan mengancam peranan strategis tersebut diatas dan akan memberikan pengaruh merugikan pada lingkungan hidup serta kehidupan manusia, sehingga perlu dilakukan upaya penanggulangan melalui mitigasi iklim guna mengurangi dampak dan mengendalikan resiko perubahan iklim;
 - c. bahwa dalam rangka menindaklanjuti kesepakatan *Copenhagen Accord* hasil *The Conference of Parties ke-15 (COP-15)* di Copenhagen dan memenuhi komitmen Pemerintah Indonesia dalam pertemuan G-20 Pittsburg untuk menurunkan emisi GRK sebesar 26% dengan usaha sendiri dan mencapai 41% dengan dukungan internasional pada tahun 2020 dari kondisi tanpa adanya rencana aksi (*Business As Usual/BAU*), selanjutnya perlu disusun langkah-langkah untuk menurunkan emisi GRK, khususnya dari sektor pembangunan berbasis lahan, kehutanan dan lahan gambut yang merupakan penyumbang emisi terbesar di Indonesia dan Provinsi Jambi pada khususnya;
 - d. bahwa salah satu tindakan mitigasi iklim adalah mempersiapkan dan menerapkan secara penuh mekanisme *Reducing Emission from Deforestation and Forest Degradation Plus (REDD+)* dalam rangka bagian dari upaya penurunan

emisi GRK dan konservasi hutan tropis bagi kesejahteraan seluruh masyarakat, kesinambungan pertumbuhan ekonomi daerah, kelestarian keanekaragaman hayati serta perlindungan jasa lingkungan esensial;

- e. bahwa untuk memenuhi komitmen Provinsi Jambi dalam mendukung upaya penurunan emisi GRK Nasional yang bersumber pada sektor penggunaan lahan, kehutanan dan lahan gambut, perlu disusun penjabaran Strategi Nasional REDD+ dan Rencana Aksi Nasional REDD+;
- f. bahwa berdasarkan pertimbangan sebagaimana dimaksud dalam huruf a, huruf b, huruf c, huruf d, dan huruf e, serta sebagai pelaksanaan Undang-Undang Nomor 6 Tahun 1994 tentang Pengesahan *United Nations Framework Convention on Climate Change*, perlu ditetapkan Keputusan Gubernur Jambi tentang Strategi dan Rencana Aksi REDD+ (*Reducing Emission from Deforestation and Forest Degradation Plus*) Provinsi Jambi Tahun 2012 - 2032.

- Mengingat :
- 1. Undang-Undang Darurat Nomor 19 Tahun 1957 tentang Pembentukan Daerah-daerah Swatantra Tingkat I Sumatra Barat, Jambi dan Riau (Lembaran Negara Republik Indonesia Tahun 1957 Nomor 75) sebagaimana telah diubah dengan Undang-Undang Nomor 61 tahun 1958 tentang Penetapan Undang-Undang Darurat Nomor 19 Tahun 1957 tentang Pembentukan Daerah-Daerah Swatantra Tingkat I Sumatera Barat, Jambi dan Riau menjadi Undang-Undang (Lembaran Negara Republik Indonesia tahun 1958 Nomor 112, Tambahan Lembaran Negara Republik Indonesia Nomor 1646);
 - 2. Undang-Undang Nomor 5 Tahun 1990 tentang Konservasi Sumber Daya Alam Hayati dan Ekosistemnya (Lembaran Negara Republik Indonesia Tahun 1990 Nomor 49, Tambahan Lembaran Negara Republik Indonesia Nomor 3419);
 - 3. Undang-Undang Nomor 6 Tahun 1994 tentang Pengesahan *United Nations Framework Convention on Climate Change* (Konvensi Kerangka Kerja Perserikatan Bangsa-Bangsa Mengenai Perubahan Iklim) (Lembaran Negara Republik Indonesia Tahun 1994 Nomor 42, Tambahan Lembaran Negara Republik Indonesia Nomor 3557);
 - 4. Undang-Undang Nomor 41 Tahun 1999 tentang Kehutanan (Lembaran Negara Republik Indonesia Tahun 1999 Nomor 167, Tambahan Lembaran Negara Republik Indonesia Nomor 3888) sebagaimana telah diubah dengan Undang-Undang Nomor 19 Tahun 2004 tentang Penetapan Peraturan Pemerintah Pengganti Undang-Undang Nomor 1 Tahun 2004 tentang Perubahan atas Undang-Undang Nomor 41 Tahun 1999 menjadi Undang-Undang (Lembaran Negara Republik Indonesia Tahun 2004 Nomor 86, Tambahan Lembaran Negara Republik Indonesia Nomor 4412);
 - 5. Undang-Undang Nomor 17 Tahun 2003 tentang Keuangan Negara (Lembaran Negara Republik Indonesia Tahun 2003 Nomor 47, Tambahan Lembaran Negara Republik Indonesia Nomor 5286);
 - 6. Undang-Undang Nomor 17 Tahun 2004 tentang Pengesahan *Kyoto Protocol to The United Nations Framework Convention on Climate Change* (Protokol Kyoto tentang Kerangka Konvensi Kerangka Kerja Perserikatan Bangsa Bangsa tentang Perubahan Iklim) (Lembaran Negara Republik Indonesia Tahun 2004 Nomor 72, Tambahan Lembaran Negara Republik Indonesia Nomor 4403);

7. Undang-Undang Nomor 32 Tahun 2004 tentang Pemerintahan Daerah (Lembaran Negara Republik Indonesia Tahun 2004 Nomor 125, Tambahan Lembaran Negara Republik Indonesia Nomor 4437), sebagaimana telah beberapa kali diubah, terakhir dengan Undang-Undang Nomor 12 Tahun 2008 (Lembaran Negara Republik Indonesia Tahun 2008 Nomor 59, Tambahan Lembaran Negara Republik Indonesia Nomor 4844);
8. Undang-Undang Nomor 26 Tahun 2007 tentang Penataan Ruang (Lembaran Negara Republik Indonesia Tahun 2007 Nomor 68, Tambahan Lembaran Negara Republik Indonesia Nomor 4725);
9. Undang-Undang Nomor 32 Tahun 2009 tentang Perlindungan dan Pengelolaan Lingkungan Hidup (Lembaran Negara Republik Indonesia Tahun 2004 Nomor 53, Tambahan Lembaran Negara Republik Indonesia Nomor 5059);
10. Undang-Undang Nomor 12 Tahun 2011 tentang Pembentukan Peraturan Perundang-undangan (Lembaran Negara Republik Indonesia Tahun 2004 Nomor 53, Tambahan Lembaran Negara Republik Indonesia Nomor 4389);
11. Peraturan Pemerintah Nomor 2 Tahun 2006 tentang Tata Cara Pengadaan Pinjaman dan/atau Penerimaan Hibah Luar Negeri (Lembaran Negara Republik Indonesia Tahun 2006 Nomor 3, Tambahan Lembaran Negara Republik Indonesia Nomor 4597);
12. Peraturan Pemerintah Nomor 6 Tahun 2007 tentang Tata Hutan dan Penyusunan Rencana Pengelolaan Hutan, serta Pemanfaatan Hutan (Lembaran Negara Republik Indonesia Tahun 2007 Nomor 22, Tambahan Lembaran Negara Nomor 4696), sebagaimana telah diubah dengan Peraturan Pemerintah Nomor 3 Tahun 2008 tentang Perubahan atas Peraturan Pemerintah Nomor 6 tahun 2007 tentang Tata Hutan dan Penyusunan Rencana Pengelolaan Hutan, serta Pemanfaatan Hutan (Lembaran Negara Republik Indonesia Tahun 2008 Nomor 16, Tambahan Lembaran Negara Republik Indonesia Nomor 4814);
13. Peraturan Pemerintah Nomor 28 Tahun 2011 tentang Pengelolaan Kawasan Suaka Alam dan Kawasan Pelestarian Alam (Lembaran Negara Republik Indonesia Tahun 2006 Nomor 3, (Lembaran Negara Republik Indonesia Tahun 2006 Nomor 3, Tambahan Lembaran Negara Republik Indonesia Nomor 5217);
14. Peraturan Presiden Nomor 61 Tahun 2011 tentang Rencana Aksi Nasional Penurunan Emisi Gas Rumah Kaca;
15. Peraturan Presiden Nomor 71 Tahun 2011 tentang Penyelenggaraan Inventarisasi Gas Rumah Kaca Nasional;
16. Peraturan Presiden Nomor 13 Tahun 2012 tentang Rencana Tata Ruang Sumatera (Lembaran Negara Tahun 2012 Nomor 31);
17. Keputusan Presiden Nomor 25 Tahun 2011 tentang Satuan Tugas Persiapan Kelembagaan REDD+;
18. Peraturan Menteri Kehutanan Nomor P.29/Menhut-II/2012 tentang Penyelenggaraan Karbon Hutan;
19. Peraturan Gubernur Jambi Nomor 36 Tahun 2012 tentang Rencana Aksi Daerah Penurunan Gas Rumah Kaca;

Memperhatikan : Keputusan Gubernur Provinsi Jambi Nomor 386/Kep-Gub/EkBangSDA/2011 tentang Komisi Daerah REDD+ Provinsi Jambi.

MEMUTUSKAN

Menetapkan : KEPUTUSAN GUBERNUR JAMBI TENTANG STRATEGI DAN RENCANA AKSI PROVINSI REDD+ (*Reducing Emission from Deforestation and Forest Degradation Plus*) PROVINSI JAMBI TAHUN 2012 - 2032

KESATU : Mengesahkan dan menetapkan Dokumen Utama dan Dokumen Risalah Eksekutif SRAP REDD+ Provinsi Jambi Tahun 2012 - 2032 sebagaimana tercantum dalam Lampiran I dan II Keputusan ini.

KEDUA : Dokumen sebagaimana dimaksud pada diktum KESATU merupakan penjabaran dari visi, misi, tujuan dan prinsip yang penyusunannya berpedoman pada STRATAS REDD+ dan RAN REDD+, dengan memperhatikan RAN-GRK, memuat arah strategi dan rencana aksi REDD+, Program, kegiatan dan rencana aksi prioritas lintas satuan kerja perangkat daerah dan lintas pelaku kepentingan, program kewilayahan disertai dengan rencana kerja dalam kerangka regulasi dan kerangka pendanaan yang bersifat indikatif.

KETIGA : Dokumen SRAP REDD+ Jambi berfungsi sebagai:

- a. Pedoman dan atau acuan dalam kegiatan persiapan dan implementasi penuh kegiatan REDD+ di Provinsi Jambi;
- b. Bahan penyusunan usulan pendanaan dan evaluasi capaian sasaran implementasi REDD+ di Provinsi Jambi;
- c. Pedoman para pihak pemangku amanah terkait dalam menyusun kegiatan persiapan dan kegiatan implementasi penuh REDD+ di Provinsi Jambi; dan
- d. Bahan pertimbangan teknis dan rujukan kebijakan daerah dalam penertiban dan/atau pemberian izin pemanfaatan lahan, kawasan hutan dan lahan gambut.

KEEMPAT : Keputusan ini mulai berlaku sejak tanggal ditetapkan

Ditetapkan di Jambi

Pada tanggal 27 Mei 2013



Tembusan:

1. Menteri Kehutanan RI
2. Menteri PPN/Bappenas RI
3. Ketua Satuan Tugas Persiapan Kelembagaan REDD+
4. Para Kepala SKPD lingkup Pemerintah Provinsi Jambi
5. Komisi Daerah REDD+ Provinsi Jambi
6. Para Bupati se-Provinsi Jambi
7. Biro Hukum Setda Provinsi Jambi (3 Eksemplar)