

Supporting Information

Koh et al. 10.1073/pnas.1018776108

Table S1. Closed canopy oil-palm plantations in the lowlands of Peninsular Malaysia, Borneo, and Sumatra, differentiated by the soil type on which plantations occur

Region/subregion	Oil-palm plantations, ha			Total land area, ha
	Mineral soil	Peat soil	Total	
Peninsular Malaysia	1,769,013 (88.2)*	236,820 (11.8)	2,005,833	11,322,358
Borneo	2,199,569 (92.5)	177,191 (7.5)	2,376,760	59,437,156
Sarawak	254,075 (71)	103,841 (29)	357,915	9,392,068
Sabah	888,573 (96.7)	30,166 (3.3)	918,739	5,384,366
West Kalimantan	248,161 (90.6)	25,611 (9.4)	273,772	13,219,483
Central Kalimantan	477,248 (96.5)	17,542 (3.5)	494,789	14,436,472
South Kalimantan	212,274 (100)	0	212,274	3,574,524
East Kalimantan	119,239 (100)	31 (<0.1)	119,270	13,430,243
Sumatra	3,407,285 (88)	464,554 (12)	3,871,839	34,033,563
Aceh	136,182 (93.4)	9,696 (6.6)	145,878	3,060,592
North Sumatra	984,207 (90)	108,826 (10)	1,093,033	4,010,762
Riau	1,246,557 (83.8)	241,830 (16.2)	1,488,386	8,965,788
West Sumatra	140,039 (81.4)	32,023 (18.6)	172,063	1,992,865
Jambi	261,035 (90.6)	27,057 (9.4)	288,092	3,896,060
Bengkulu	111,780 (87.4)	16,139 (12.6)	127,919	1,297,330
South Sumatra	398,806 (95.2)	19,984 (4.8)	418,790	7,876,388
Lampung	128,679 (93.5)	8,998 (6.5)	137,678	2,933,776
Total study region	7,375,866 (89.4)	878,565 (10.6)	8,254,431	104,793,076

*Number in parentheses indicates percentage of total oil-palm area of region/subregion.

Table S2. Composition of peatlands in the lowlands of Peninsular Malaysia, Borneo, and Sumatra

Region/subregion	Peatland area, ha					
	Peatswamp forest	Regrowth forest*	Mosaic*	Closed canopy oil palm*	Cleared peatland*	Total
Peninsular Malaysia	234,252 (26.8) [†]	123,339 (14.1)	174,580 (19.9)	236,820 (27.1)	106,246 (12.1)	875,237
Borneo	3,137,943 (43.6)	1,904,728 (26.5)	782,607 (10.9)	177,191 (2.5)	1,198,244 (16.6)	7,200,713
Sarawak	397,011 (27.5)	453,443 (31.4)	193,250 (13.4)	103,841 (7.2)	294,697 (20.4)	1,442,243
Sabah	38,859 (20.9)	49,490 (26.6)	27,051 (14.5)	30,166 (16.2)	40,461 (21.7)	186,027
West Kalimantan	1,029,497 (61.9)	329,182 (19.8)	119,039 (7.2)	25,611 (1.5)	159,288 (9.6)	1,662,618
Central Kalimantan	1,434,715 (48.6)	776,905 (26.3)	317,754 (10.8)	17,542 (0.6)	404,433 (13.7)	2,951,349
South Kalimantan	3,496 (1.2)	87,757 (28.9)	50,761 (16.7)	(0)	161,899 (53.3)	303,914
East Kalimantan	234,365 (35.8)	207,949 (31.8)	74,752 (11.4)	31 (<0.01)	137,466 (21)	654,563
Sumatra	1,836,637 (27.5)	2,585,002 (38.8)	813,976 (12.2)	464,554 (7)	968,460 (14.5)	6,668,629
Aceh	98,488 (45)	81,376 (37.2)	18,613 (8.5)	9,696 (4.4)	10,712 (4.9)	218,886
North Sumatra	24,271 (8.4)	64,707 (22.4)	55,672 (19.2)	108,826 (37.6)	35,781 (12.4)	289,257
Riau	1,407,627 (36)	1,362,187 (34.8)	445,766 (11.4)	241,830 (6.2)	454,889 (11.6)	3,912,299
West Sumatra	16,277 (10.3)	44,922 (28.4)	31,980 (20.2)	32,023 (20.3)	32,752 (20.7)	157,955
Jambi	164,124 (28.7)	236,365 (41.3)	74,048 (12.9)	27,057 (4.7)	70,895 (12.4)	572,489
Bengkulu	692 (1.5)	10,955 (23.7)	11,796 (25.5)	16,139 (34.9)	6,699 (14.5)	46,281
South Sumatra	122,909 (8.8)	768,237 (54.9)	170,143 (12.2)	19,984 (1.4)	317,679 (22.7)	1,398,953
Lampung	2,250 (3.1)	16,252 (22.4)	5,957 (8.2)	8,998 (12.4)	39,052 (53.9)	72,509
Total study region	5,208,832 (35.3)	4,613,069 (31.3)	1,771,163 (12)	878,565 (6)	2,272,950 (15.4)	14,744,579

*Regrowth forest refers to closed canopy plantations (excluding oil palm) and natural secondary forests; mosaic refers to mosaic of closed canopy vegetation and open areas comprising croplands, agroforests, and small forest patches; closed canopy oil palm refers to large scale, mature oil-palm monoculture; cleared peatland refers to open areas covered by remnants of original vegetation, sparse grass/shrublands, transitional agricultural areas, and extremely degraded areas.

[†]Number in parentheses indicates percentage of total peatland area of region/subregion.

Table S3. Projected biodiversity outcomes of land-use transition scenarios for cleared peatlands in Peninsular Malaysia, Borneo, and Sumatra

Region/subregion	Oil-palm establishment, %	Mosaic regrowth, %	Forest regrowth, %
Peninsular Malaysia	-1.6 (± 0.005)*	0.7 (± 0.009)	1.8 (± 0.008)
Borneo	-2.1 (± 0.007)	0.9 (± 0.011)	2.4 (± 0.011)
Sarawak	-2.9 (± 0.01)	1.2 (± 0.016)	3.4 (± 0.015)
Sabah	-3.2 (± 0.011)	1.4 (± 0.018)	3.8 (± 0.017)
West Kalimantan	-1.1 (± 0.004)	0.4 (± 0.006)	1.2 (± 0.005)
Central Kalimantan	-1.7 (± 0.006)	0.7 (± 0.009)	1.9 (± 0.009)
South Kalimantan	-12.4 (± 0.042)	8.9 (± 0.089)	19.9 (± 0.097)
East Kalimantan	-2.8 (± 0.01)	1.2 (± 0.016)	3.3 (± 0.015)
Sumatra	-2.1 (± 0.007)	0.9 (± 0.012)	2.5 (± 0.011)
Aceh	-0.6 (± 0.002)	0.2 (± 0.003)	0.7 (± 0.003)
North Sumatra	-2 (± 0.006)	1.0 (± 0.011)	2.4 (± 0.01)
Riau	-1.6 (± 0.005)	0.6 (± 0.009)	1.8 (± 0.008)
West Sumatra	-3.5 (± 0.011)	1.7 (± 0.02)	4.3 (± 0.019)
Jambi	-1.8 (± 0.006)	0.7 (± 0.01)	2.1 (± 0.01)
Bengkulu	-2.8 (± 0.009)	1.7 (± 0.017)	3.6 (± 0.016)
South Sumatra	-4.5 (± 0.015)	2.1 (± 0.026)	6 (± 0.028)
Lampung	-10.3 (± 0.034)	5.8 (± 0.064)	14.8 (± 0.067)
Total study region	-2.1 (± 0.007)	0.9 (± 0.011)	2.4 (± 0.011)

*Number in parentheses indicates SE. Projected change in biodiversity (percentage of bird species) is relative to current remaining biodiversity; modeled based on a matrix-calibrated species-area model (1, 2). Land-use transition scenarios are oil-palm establishment (cleared peatland to oil palm), mosaic regrowth (cleared peatland to mosaic), and forest regrowth (cleared peatland to regrowth forest).

1. Koh LP, Ghazoul J (2010) A matrix-calibrated species-area model for predicting biodiversity losses due to land-use change. *Conserv Biol* 24:994–1001.
2. Koh LP, Lee TM, Sodhi NS, Ghazoul J (2010) An overhaul of the species-area approach for predicting biodiversity loss: Incorporating matrix and edge effects. *J Appl Ecol* 47:1063–1070.