

Supplementary Materials for
Threat of mining to African great apes

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Supplementary Text

Additional figures and tables including extended results.

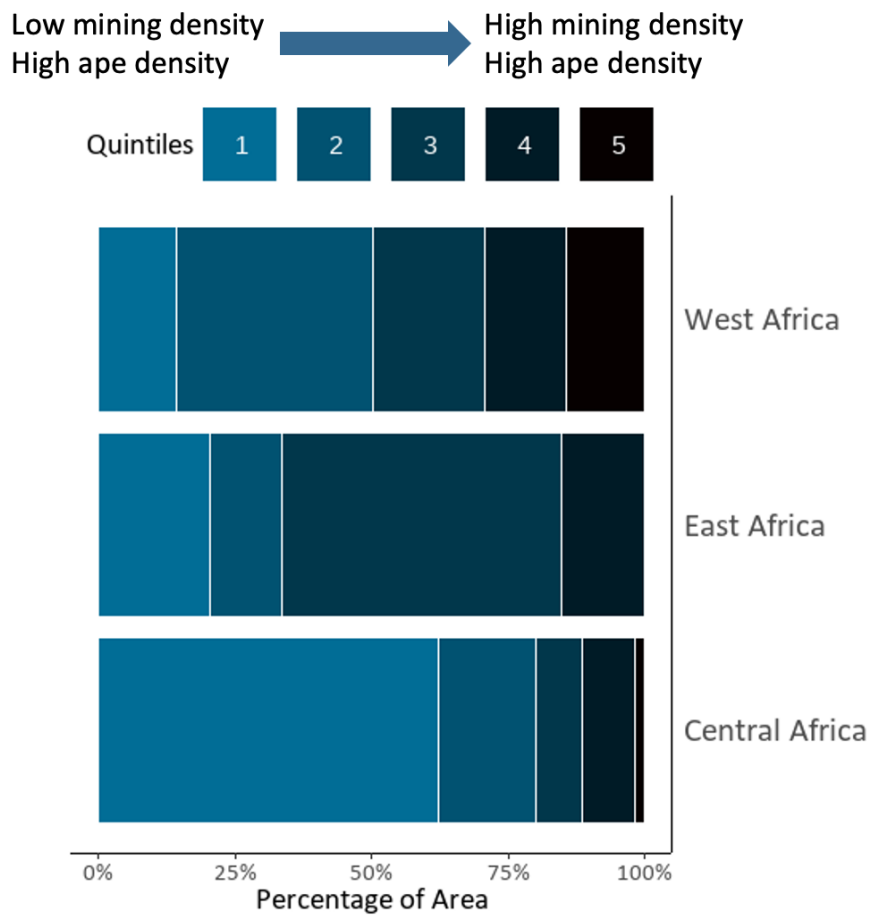


Fig. S1: Percentage of area with high ape density that falls into quintiles with varying mining density. Each quintile represents a 20% change in mining density.

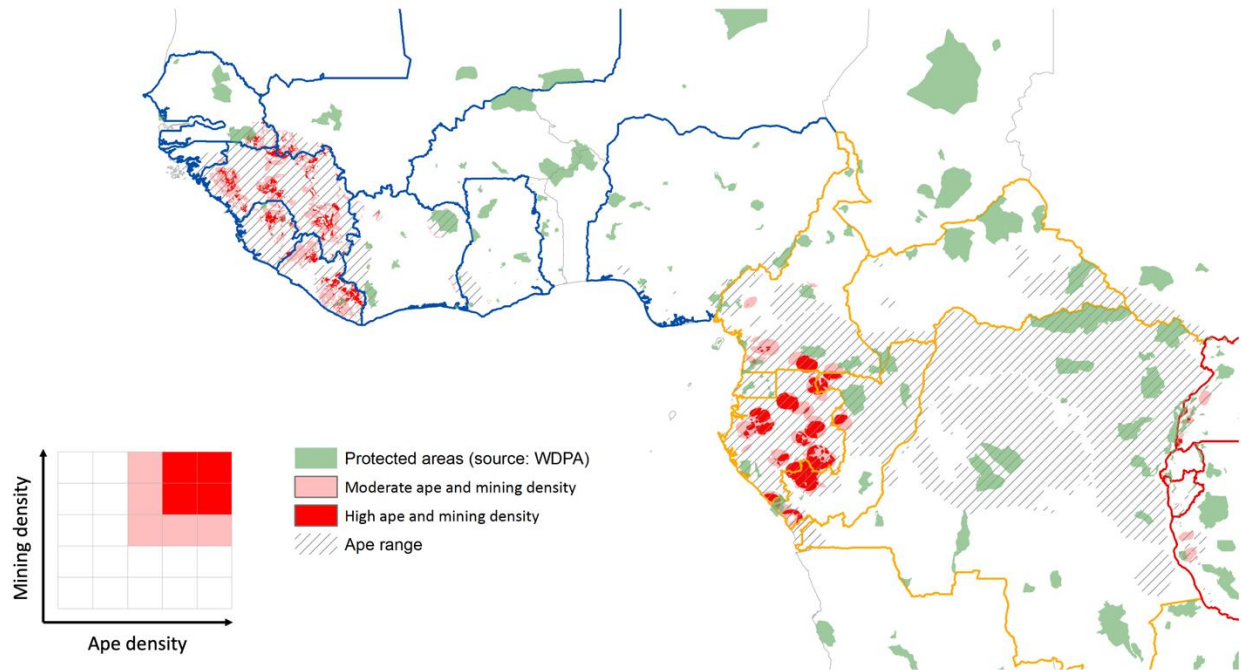


Fig. S2: Distribution of so-called critical areas (dark red), which are areas with high ape and high mining density in relation to the location of IUCN protected areas (categories 1-4). Categories are based on mining and ape density quintiles.

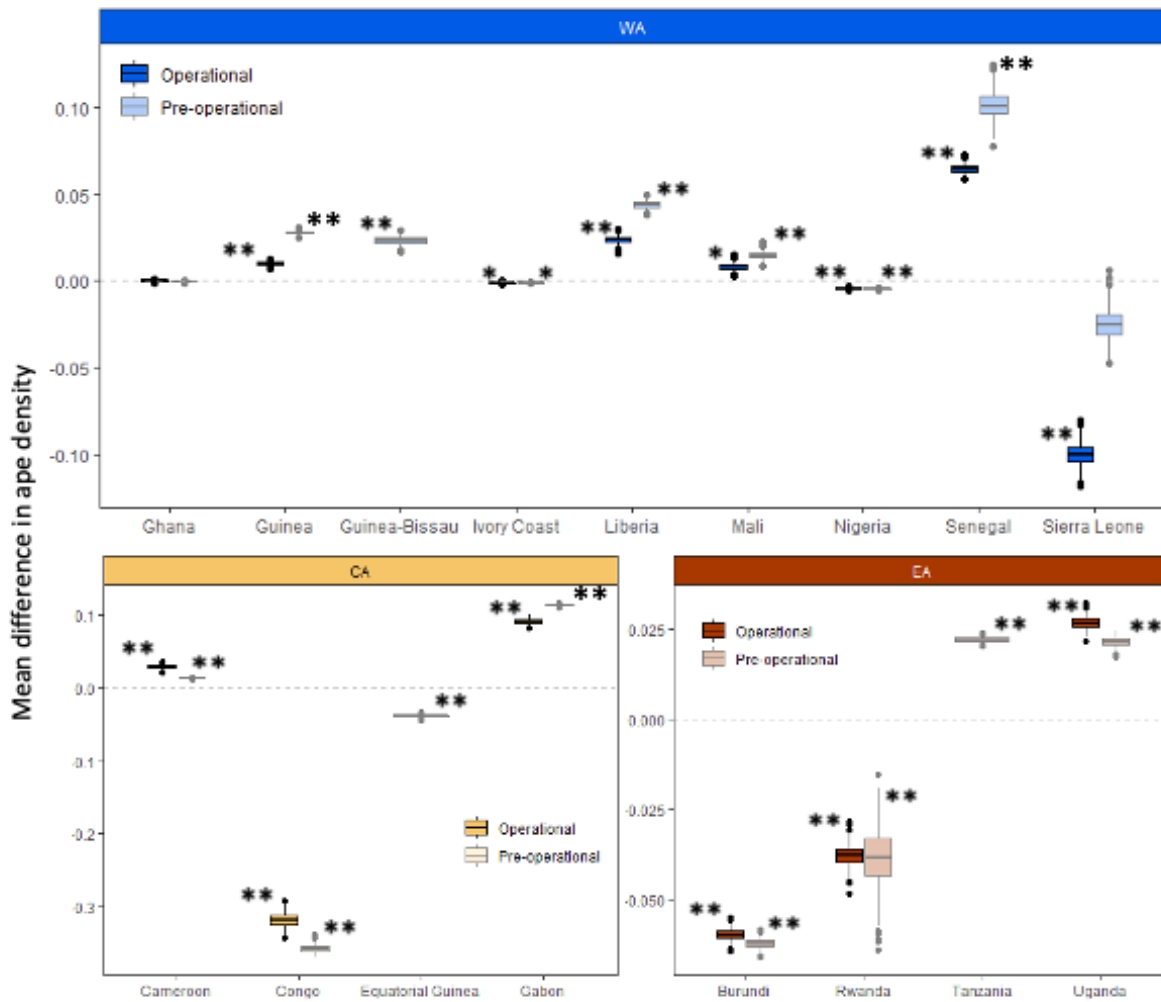


Fig. S3: Box plots comparing the average difference in randomly selected samples of ape densities between areas within a 50 km buffer of preoperational and operational mining areas and randomly selected non-mining areas across countries in West Africa ("WA"), central Africa ("CA"), and East Africa ("EA"). The dotted line indicates no difference between these areas. Values above the dotted line indicate that mining areas are located more often in areas with high- rather than low ape densities and vice versa. Significant differences are marked with an asterisk (* $p < 0.01$, ** $p < 0.001$).

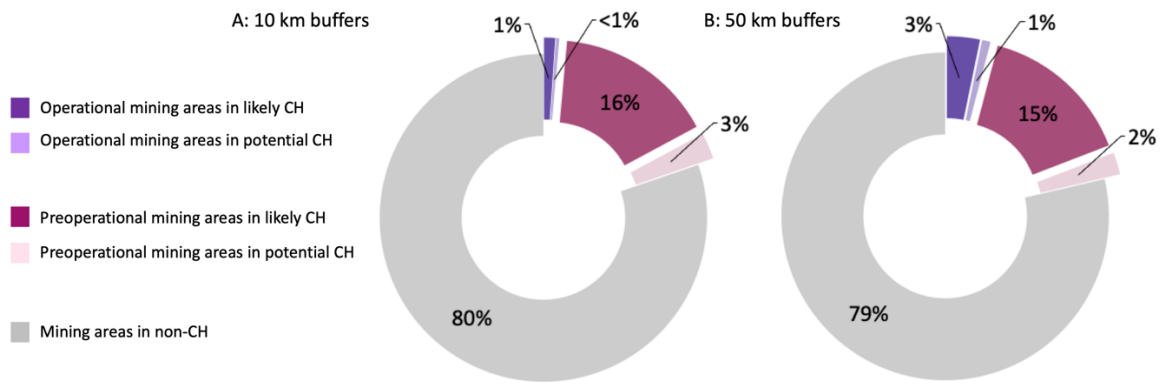


Fig. S4: Proportional overlap of likely and potential CH with pre-operational and operational mining areas with (A) 10 km and (B) 50 km buffers.

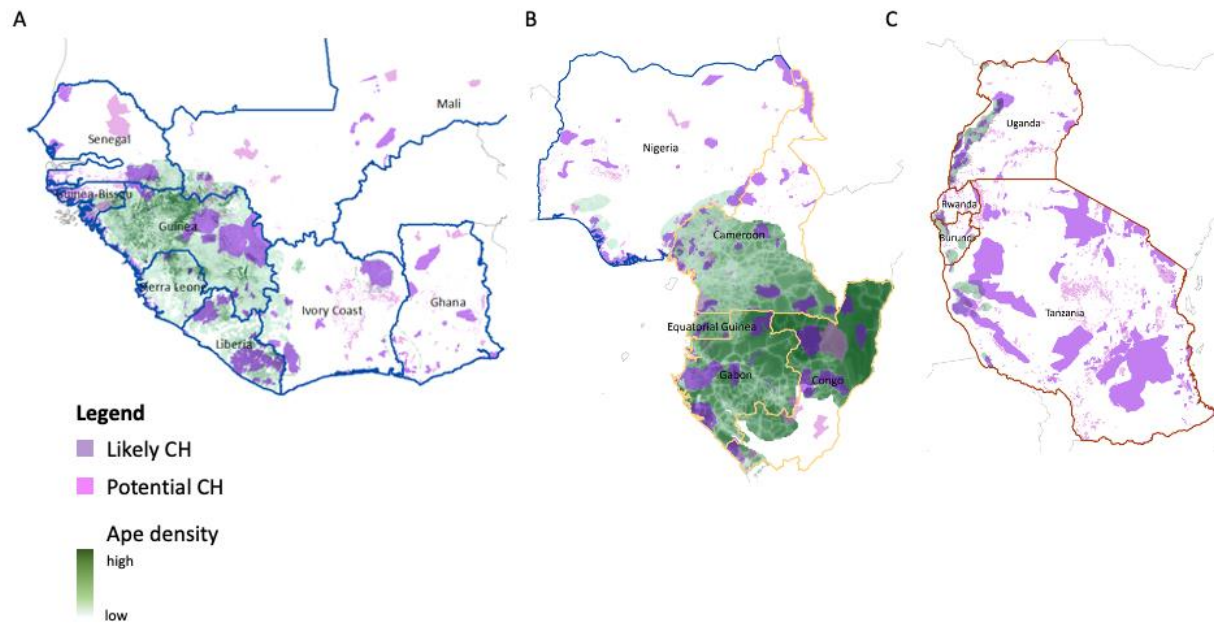


Fig. S5: Distribution of likely and potential Critical Habitat (CH) mapped by Brauner et al. (44) in relation to chimpanzee density distribution in (A) West African range countries, (B) central African ape range countries and in Nigeria in West Africa, and (C) in East African ape range countries.

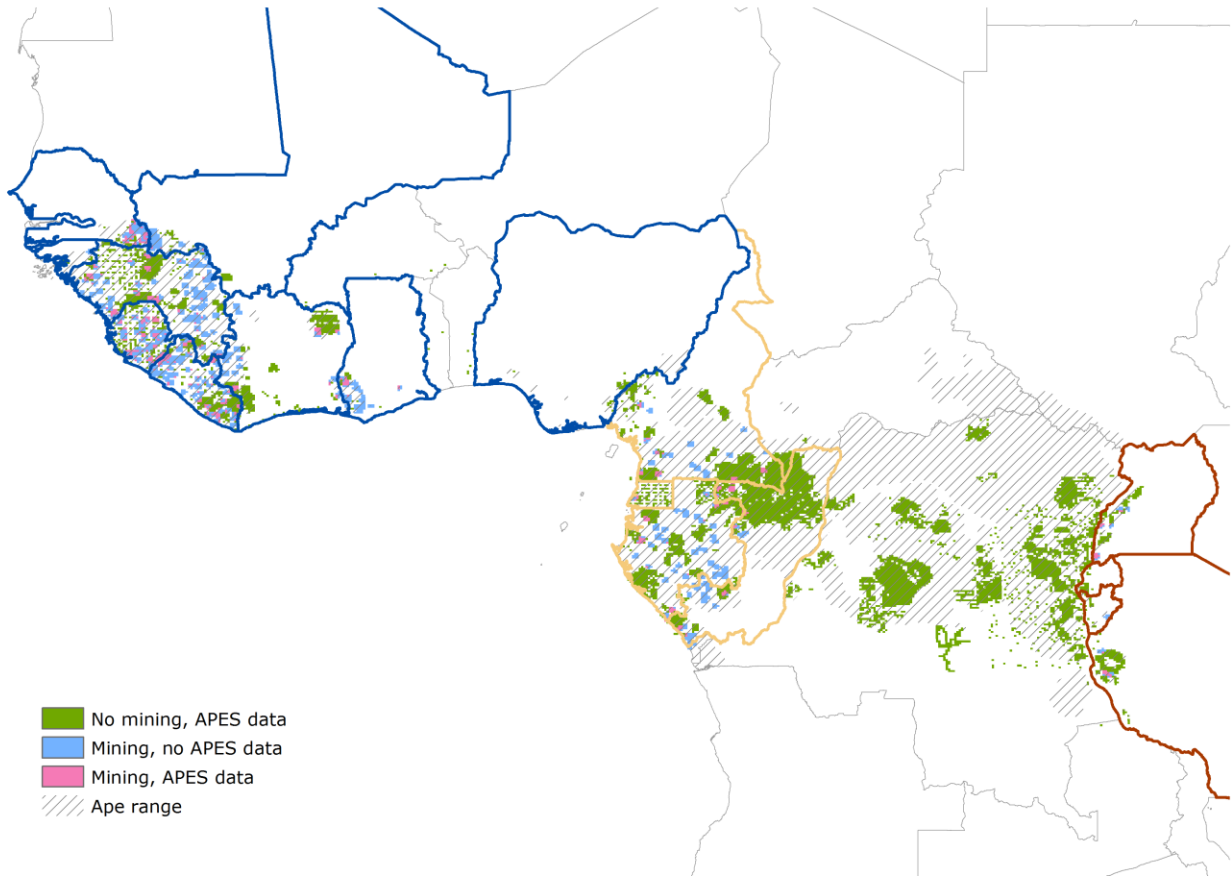


Fig. S6: Distribution of areas surveyed for apes outside (green) and inside (pink) mining areas for which data have been archived in the IUCN SSC A.P.E.S. database. Areas that overlap with mining areas and for which no data currently exist in this database are marked in blue.

Table S1.

Summary statistics of the t-test iterations.

Country	Buffer	Mining stage	Ape density inside mining area	Ape density outside mining area	Delta (density)	t	p
Burundi	10 km	Pre-operational	0.011638188	0.031590731	-0.019952543	-4.507.293.406	0.001517927
Cameroon	10 km	Operational	0.180626455	0.176733369	0.003893085	0.450978239	0.473900012
Cameroon	10 km	Pre-operational	0.166250598	0.176854398	-0.0106038	-4.144.231.793	0.001960298
Congo	10 km	Operational	0.439514051	0.880613391	-0.44109934	-1.386.245.155	4.95E-29
Congo	10 km	Pre-operational	0.426578742	0.881770027	-0.455191284	-3.544.981.685	5.71E-225
Equatorial Guinea	10 km	Pre-operational	0.196844397	0.282826184	-0.085981787	-1.316.353.314	1.42E-26
Gabon	10 km	Operational	0.420340257	0.459753729	-0.039413471	-2.692.699.409	0.051678722
Gabon	10 km	Pre-operational	0.434007938	0.459644476	-0.025636538	-6.025.848.181	3.81E-06
Ghana	10 km	Operational	0.001193925	0.000734062	0.000459863	2.293.726.831	0.088614268
Ghana	10 km	Pre-operational	0.000805535	0.000727298	7.82E-05	0.715163054	0.422299934
Guinea	10 km	Operational	0.082441709	0.117805202	-0.035363493	-1.018.947.128	4.90E-17
Guinea	10 km	Pre-operational	0.082809034	0.117900886	-0.035091852	-2.315.112.192	9.11E-95
Guinea-Bissau	10 km	Pre-operational	0.051680894	0.054745044	-0.00306415	-0.37573626	0.47403811
Côte d'Ivoire	10 km	Operational	0.002953378	0.004491999	-0.001538621	-1.291.528.735	0.30270511
Côte d'Ivoire	10 km	Pre-operational	0.00302172	0.004518158	-0.001496437	-4.476.388.942	0.001911229
Liberia	10 km	Operational	0.068105182	0.068056538	4.86E-05	0.013861984	0.508277722
Liberia	10 km	Pre-operational	0.072520975	0.068121629	0.004399346	5.074.631.434	0.000100875

Mali	10 km	Operational	0.014976436	0.01796701	-0.002990574	-1.285.027.019	0.288851045
Mali	10 km	Pre-operational	0.015547243	0.017863073	-0.00231583	-1.969.568.711	0.15093424
Senegal	10 km	Operational	0.085338966	0.032824987	0.05251398	9.611.755.652	7.60E-10
Senegal	10 km	Pre-operational	0.07220381	0.032830415	0.039373395	1.752.467.108	5.95E-33
Sierra Leone	10 km	Operational	0.099492755	0.064999394	0.034493361	4.679.786.441	0.000278563
Sierra Leone	10 km	Pre-operational	0.122393648	0.064960702	0.057432946	112.213.633	3.65E-24
Tanzania	10 km	Pre-operational	0.018332528	0.01548143	0.002851098	1.700.079.348	0.206209531
Uganda	10 km	Operational	0.050997944	0.03740852	0.013589424	1.554.099.701	0.233615488
Uganda	10 km	Pre-operational	0.04448359	0.037428451	0.007055138	1.861.821.576	0.173787147
Burundi	50 km	Operational	0.020020946	0.079737032	-0.059716086	-3.533.388.062	2.94E-190
Burundi	50 km	Pre-operational	0.017535976	0.079776836	-0.06224086	-4.604.866.596	0
Cameroon	50 km	Operational	0.196097456	0.167677364	0.028420093	1.244.741.187	1.35E-22
Cameroon	50 km	Pre-operational	0.180568012	0.167736614	0.012831398	1.915.138.795	8.93E-64
Congo	50 km	Operational	0.636668201	0.954520482	-0.317852281	-3.443.535.282	7.34E-211
Congo	50 km	Pre-operational	0.598391753	0.954594492	-0.356202739	-6.290.485.326	0
Equatorial Guinea	50 km	Pre-operational	0.252561301	0.291405234	-0.038843933	-1.925.305.047	6.06E-65
Gabon	50 km	Operational	0.491196206	0.400262088	0.090934118	2.801.983.456	1.33E-139
Gabon	50 km	Pre-operational	0.512947955	0.40020572	0.112742235	7.408.151.606	0
Ghana	50 km	Operational	0.000885132	0.000931537	-4.64E-05	-0.131361736	0.497518613
Ghana	50 km	Pre-operational	0.000645362	0.00092673	-0.000281369	-0.836891663	0.374650481
Guinea	50 km	Operational	0.116337613	0.106260081	0.010077532	9.614.639.349	1.07E-14

Guinea	50 km	Pre-operational	0.133996894	0.106280987	0.027715907	2.457.292.857	2.12E-113
Guinea-Bissau	50 km	Pre-operational	0.068877147	0.045553776	0.023323371	107.969.938	8.74E-19
Côte d'Ivoire	50 km	Operational	0.00419379	0.005308866	-0.001115075	-3.954.523.329	0.007234691
Côte d'Ivoire	50 km	Pre-operational	0.004419231	0.005301041	-0.000881811	-4.243.695.947	0.002598921
Liberia	50 km	Operational	0.068653479	0.04460189	0.02405159	1.129.831.694	2.53E-17
Liberia	50 km	Pre-operational	0.088535102	0.044520997	0.044014106	2.004.524.744	5.34E-69
Mali	50 km	Operational	0.01910823	0.010834707	0.008273523	4.674.740.154	0.001667356
Mali	50 km	Pre-operational	0.025423923	0.01089057	0.014533353	7.674.559.163	4.30E-08
Nigeria	50 km	Operational	0.000835946	0.005240337	-0.004404391	-1.180.587.183	3.25E-24
Nigeria	50 km	Pre-operational	0.000672625	0.005238227	-0.004565602	-1.673.702.327	4.58E-50
Rwanda	50 km	Operational	0.001843287	0.03957955	-0.037736263	-1.408.376.703	7.49E-30
Rwanda	50 km	Pre-operational	0.000835882	0.039317781	-0.038481899	-4.961.543.593	0.000136427
Senegal	50 km	Operational	0.077432203	0.012692115	0.064740088	3.020.343.618	3.37E-170
Senegal	50 km	Pre-operational	0.113960046	0.012694311	0.101265734	1.253.280.545	4.28E-30
Sierra Leone	50 km	Operational	0.067614929	0.167912479	-0.10029755	-1.383.089.143	1.18E-24
Sierra Leone	50 km	Pre-operational	0.142967012	0.167882423	-0.024915411	-2.638.385.812	0.054320188
Tanzania	50 km	Pre-operational	0.032257666	0.010193988	0.022063677	3.523.887.187	5.30E-226
Uganda	50 km	Operational	0.051113241	0.02447856	0.026634681	1.567.325.982	1.18E-37
Uganda	50 km	Pre-operational	0.045878346	0.024517811	0.021360536	1.795.297.512	2.57E-48

Table S2.

Total- and proportional overlap between ape density distribution and mining areas with 10 km- and 50 km buffers in the different range countries.

Region	No. apes threatened by mining (10 km buffers)	Proportional overlap % (10 km buffers)	No. apes threatened by mining (50 km buffers)	Proportional overlap % (50 km buffers)
Tanzania	58	3	988	57
Rwanda	0	0	29	14
Burundi	20	3	437	58
Uganda	214	5	2822	70
Cameroon	1292	2	23300	37
Congo	3683	1	55020	20
Gabon	5546	5	82005	69
Equatorial Guinea	62	1	1611	23
Nigeria	0	0	35	3
Ghana	25	45	56	100
Côte d'Ivoire	73	5	1125	80
Mali	356	19	1604	87
Liberia	1184	18	6505	99
Guinea	2036	7	23426	83
Sierra Leone	1341	26	4783	93
Guinea-Bissau	30	2	818	49
Senegal	623	27	1922	69