A3.1 Model formulas of all mixed effects Poisson regression models in the model set used for the model selection analysis on mixed species abundance in R

1	abundance~z.ndvi+z.sqrt.dist.field+z.sqrt.dist.river+z.sqrt.dist.roads+z.percent.protected+ ac.term+offset(log(transect.length))+ (1+ac.term||transect.ID)+(1+ac.term||species)
2	abundance~z.sqrt.market+z.ndvi+z.sqrt.dist.field+z.sqrt.dist.river+z.sqrt.dist.roads+ z.percent.protected+ac.term+offset(log(transect.length))+ (1+ac.term||transect.ID)+(1+ac.term||species)
3	abundance~z.hunter+z.ndvi+z.sqrt.dist.field+z.sqrt.dist.river+z.sqrt.dist.roads+ z.percent.protected+ac.term+offset(log(transect.length))+ (1+ac.term||transect.ID)+(1+ac.term||species)
4	abundance~z.fisher+z.ndvi+z.sqrt.dist.field+z.sqrt.dist.river+z.sqrt.dist.roads+ z.percent.protected+ac.term+offset(log(transect.length))+ (1+ac.term||transect.ID)+(1+ac.term||species)
5	abundance~z.taboo+z.ndvi+z.sqrt.dist.field+z.sqrt.dist.river+z.sqrt.dist.roads+ z.percent.protected+ac.term+offset(log(transect.length))+ (1+ac.term||transect.ID)+(1+ac.term||species)
6	abundance~z.tr.pop.size+z.ndvi+z.sqrt.dist.field+z.sqrt.dist.river+z.sqrt.dist.roads+ z.percent.protected+ac.term+offset(log(transect.length))+ (1+ac.term||transect.ID)+(1+ac.term||species)
7	abundance~z.fisher+z.taboo+z.ndvi+z.sqrt.dist.field+z.sqrt.dist.river+z.sqrt.dist.roads+ z.percent.protected+ac.term+offset(log(transect.length))+ (1+ac.term||transect.ID)+(1+ac.term||species)
8	abundance~z.hunter+z.sqrt.market+z.ndvi+z.sqrt.dist.field+z.sqrt.dist.river+z.sqrt.dist.roads+ z.percent.protected+ac.term+offset(log(transect.length))+ (1+ac.term||transect.ID)+(1+ac.term||species)
9	abundance~z.hunter+z.taboo+z.ndvi+z.sqrt.dist.field+z.sqrt.dist.river+z.sqrt.dist.roads+ z.percent.protected+ac.term+offset(log(transect.length))+ (1+ac.term||transect.ID)+(1+ac.term||species)
10	abundance~z.sqrt.market+z.taboo+z.ndvi+z.sqrt.dist.field+z.sqrt.dist.river+z.sqrt.dist.roads+ z.percent.protected+ac.term+offset(log(transect.length))+ (1+ac.term||transect.ID)+(1+ac.term||species)
11	abundance~z.sqrt.market+z.tr.pop.size+z.ndvi+z.sqrt.dist.field+z.sqrt.dist.river+ z.sqrt.dist.roads+z.percent.protected+ac.term+offset(log(transect.length))+ (1+ac.term||transect.ID)+(1+ac.term||species)
12	abundance~z.taboo+z.tr.pop.size+z.ndvi+z.sqrt.dist.field+z.sqrt.dist.river+z.sqrt.dist.roads+ z.percent.protected+ac.term+offset(log(transect.length))+ (1+ac.term||transect.ID)+(1+ac.term||species)
13	abundance~z.hunter+z.sqrt.market+z.taboo+z.ndvi+z.sqrt.dist.field+z.sqrt.dist.river+ z.sqrt.dist.roads+z.percent.protected+ ac.term+offset(log(transect.length))+ (1+ac.term||transect.ID)+(1+ac.term||species)
14	abundance~z.sqrt.market+z.taboo+z.tr.pop.size+z.ndvi+z.sqrt.dist.field+z.sqrt.dist.river+ z.sqrt.dist.roads+z.percent.protected+ ac.term+offset(log(transect.length))+ (1+ac.term||transect.ID)+(1+ac.term||species)
15	abundance~z.ndvi+z.sqrt.dist.field+z.sqrt.dist.river+z.sqrt.dist.roads+z.percent.protected+ ac.term+offset(log(transect.length))+ (1+ac.term||transect.ID)+(1+z.ndvi+z.sqrt.dist.field+z.sqrt.dist.river+z.sqrt.dist.roads+ z.percent.protected+ac.term||species)
16	abundance~z.sqrt.market+z.ndvi+z.sqrt.dist.field+z.sqrt.dist.river+z.sqrt.dist.roads+ z.percent.protected+ ac.term+offset(log(transect.length))+ (1+ac.term||transect.ID)+(1+z.sqrt.market+z.ndvi+z.sqrt.dist.field+z.sqrt.dist.river+

	z.sqrt.dist.roads+z.percent.protected+ac.term||species)
17	abundance~z.hunter+z.ndvi+z.sqrt.dist.field+z.sqrt.dist.river+z.sqrt.dist.roads+ z.percent.protected+ac.term+offset(log(transect.length))+ (1+ac.term||transect.ID)+(1+z.hunter+z.ndvi+z.sqrt.dist.field+z.sqrt.dist.river+z.sqrt.dist.roads+ z.percent.protected+ac.term||species)
18	abundance~z.fisher+z.ndvi+z.sqrt.dist.field+z.sqrt.dist.river+z.sqrt.dist.roads+ z.percent.protected+ac.term+offset(log(transect.length))+ (1+ac.term||transect.ID)+(1+z.fisher+z.ndvi+z.sqrt.dist.field+z.sqrt.dist.river+z.sqrt.dist.roads+ z.percent.protected+ac.term||species)
19	abundance~z.taboo+z.ndvi+z.sqrt.dist.field+z.sqrt.dist.river+z.sqrt.dist.roads+ z.percent.protected+ac.term+offset(log(transect.length))+ (1+ac.term||transect.ID)+(1+z.taboo+z.ndvi+z.sqrt.dist.field+z.sqrt.dist.river+z.sqrt.dist.roads+ z.percent.protected+ac.term||species)
20	abundance~z.tr.pop.size+z.ndvi+z.sqrt.dist.field+z.sqrt.dist.river+z.sqrt.dist.roads+ z.percent.protected+ac.term+offset(log(transect.length))+ (1+ac.term||transect.ID)+(1+z.tr.pop.size+z.ndvi+z.sqrt.dist.field+z.sqrt.dist.river+ z.sqrt.dist.roads+z.percent.protected+ac.term||species)
21	abundance~z.fisher+z.taboo+z.ndvi+z.sqrt.dist.field+z.sqrt.dist.river+z.sqrt.dist.roads+ z.percent.protected+ac.term+offset(log(transect.length))+ (1+ac.term||transect.ID)+(1+z.fisher+z.taboo+z.ndvi+z.sqrt.dist.field+z.sqrt.dist.river+ z.sqrt.dist.roads+z.percent.protected+ac.term||species)
22	abundance~z.hunter+z.sqrt.market+z.ndvi+z.sqrt.dist.field+z.sqrt.dist.river+z.sqrt.dist.roads+ z.percent.protected+ac.term+offset(log(transect.length))+ (1+ac.term||transect.ID)+(1+z.hunter+z.sqrt.market+z.ndvi+z.sqrt.dist.field+z.sqrt.dist.river+ z.sqrt.dist.roads+z.percent.protected+ac.term||species)
23	abundance~z.hunter+z.taboo+z.ndvi+z.sqrt.dist.field+z.sqrt.dist.river+z.sqrt.dist.roads+ z.percent.protected+ac.term+offset(log(transect.length))+ (1+ac.term||transect.ID)+(1+z.hunter+z.taboo+z.ndvi+z.sqrt.dist.field+z.sqrt.dist.river+ z.sqrt.dist.roads+z.percent.protected+ac.term||species)
24	abundance~z.sqrt.market+z.taboo+z.ndvi+z.sqrt.dist.field+z.sqrt.dist.river+z.sqrt.dist.roads+ z.percent.protected+ac.term+offset(log(transect.length))+ (1+ac.term||transect.ID)+(1+z.sqrt.market+z.taboo+z.ndvi+z.sqrt.dist.field+z.sqrt.dist.river+ z.sqrt.dist.roads+z.percent.protected+ac.term||species)
25	abundance~z.sqrt.market+z.tr.pop.size+z.ndvi+z.sqrt.dist.field+z.sqrt.dist.river+ z.sqrt.dist.roads+z.percent.protected+ac.term+offset(log(transect.length))+ (1+ac.term||transect.ID)+(1+z.sqrt.market+z.tr.pop.size+z.ndvi+z.sqrt.dist.field+z.sqrt.dist.river+ z.sqrt.dist.roads+z.percent.protected+ac.term||species)
26	abundance~z.taboo+z.tr.pop.size+z.ndvi+z.sqrt.dist.field+z.sqrt.dist.river+z.sqrt.dist.roads+ z.percent.protected+ac.term+offset(log(transect.length))+ (1+ac.term||transect.ID)+(1+z.taboo+z.tr.pop.size+z.ndvi+z.sqrt.dist.field+z.sqrt.dist.river+ z.sqrt.dist.roads+z.percent.protected+ac.term||species)
27	abundance~z.hunter+z.sqrt.market+z.taboo+z.ndvi+z.sqrt.dist.field+z.sqrt.dist.river+ z.sqrt.dist.roads+z.percent.protected+ac.term+offset(log(transect.length))+ (1+ac.term||transect.ID)+(1+z.hunter+z.sqrt.market+z.taboo+z.ndvi+z.sqrt.dist.field+ z.sqrt.dist.river+z.sqrt.dist.roads+z.percent.protected+ac.term||species)
28	abundance~z.sqrt.market+z.taboo+z.tr.pop.size+z.ndvi+z.sqrt.dist.field+z.sqrt.dist.river+ z.sqrt.dist.roads+z.percent.protected+ac.term+offset(log(transect.length))+ (1+ac.term||transect.ID)+(1+z.sqrt.market+z.taboo+z.tr.pop.size+z.ndvi+z.sqrt.dist.field+ z.sqrt.dist.river+z.sqrt.dist.roads+z.percent.protected+ac.term||species)
29	abundance~ac.term+offset(log(transect.length))+(1+ac.term||transect.ID)+(1+ac.term||species)
30	abundance~z.sqrt.market+ ac.term+offset(log(transect.length))+ (1+ac.term||transect.ID)+(1+ac.term||species)
31	abundance~z.hunter+ ac.term+offset(log(transect.length))+

	(1+ac.term||transect.ID)+(1+ac.term||species)
32	abundance~z.fisher+ ac.term+offset(log(transect.length))+ (1+ac.term||transect.ID)+(1+ac.term||species)
33	abundance~z.taboo+ ac.term+offset(log(transect.length))+ (1+ac.term||transect.ID)+(1+ac.term||species)
34	abundance~z.tr.pop.size+ ac.term+offset(log(transect.length))+ (1+ac.term||transect.ID)+(1+ac.term||species)
35	abundance~z.fisher+z.taboo+ ac.term+offset(log(transect.length))+ (1+ac.term||transect.ID)+(1+ac.term||species)
36	abundance~z.hunter+z.sqrt.market+ ac.term+offset(log(transect.length))+ (1+ac.term||transect.ID)+(1+ac.term||species)
37	abundance~z.hunter+z.taboo+ ac.term+offset(log(transect.length))+ (1+ac.term||transect.ID)+(1+ac.term||species)
38	abundance~z.sqrt.market+z.taboo+ ac.term+offset(log(transect.length))+ (1+ac.term||transect.ID)+(1+ac.term||species)
39	abundance~z.sqrt.market+z.tr.pop.size+ ac.term+offset(log(transect.length))+ (1+ac.term||transect.ID)+(1+ac.term||species)
40	abundance~z.taboo+z.tr.pop.size+ ac.term+offset(log(transect.length))+ (1+ac.term||transect.ID)+(1+ac.term||species)
41	abundance~z.hunter+z.sqrt.market+z.taboo+ ac.term+offset(log(transect.length))+ (1+ac.term||transect.ID)+(1+ac.term||species)
42	abundance~z.sqrt.market+z.taboo+z.tr.pop.size+ ac.term+offset(log(transect.length))+ (1+ac.term||transect.ID)+(1+ac.term||species)
43	abundance~z.sqrt.market+ ac.term+offset(log(transect.length))+ (1+ac.term||transect.ID)+(1+z.sqrt.market+ac.term||species)
44	abundance~z.hunter+ ac.term+offset(log(transect.length))+ (1+ac.term||transect.ID)+(1+z.hunter+ac.term||species)
45	abundance~z.fisher+ ac.term+offset(log(transect.length))+ (1+ac.term||transect.ID)+(1+z.fisher+ac.term||species)
46	abundance~z.taboo+ ac.term+offset(log(transect.length))+ (1+ac.term||transect.ID)+(1+z.taboo+ac.term||species)
47	abundance~z.tr.pop.size+ ac.term+offset(log(transect.length))+ (1+ac.term||transect.ID)+(1+z.tr.pop.size+ac.term||species)
48	abundance~z.fisher+z.taboo+ ac.term+offset(log(transect.length))+ (1+ac.term||transect.ID)+(1+z.fisher+z.taboo+ac.term||species)
49	abundance~z.hunter+z.sqrt.market+ ac.term+offset(log(transect.length))+ (1+ac.term||transect.ID)+(1+z.hunter+z.sqrt.market+ac.term||species)

50	abundance~z.hunter+z.taboo+ ac.term+offset(log(transect.length))+ (1+ac.term||transect.ID)+(1+z.hunter+z.taboo+ac.term||species)
51	abundance~z.sqrt.market+z.taboo+ ac.term+offset(log(transect.length))+ (1+ac.term||transect.ID)+(1+z.sqrt.market+z.taboo+ac.term||species)
52	abundance~z.sqrt.market+z.tr.pop.size+ ac.term+offset(log(transect.length))+ (1+ac.term||transect.ID)+(1+z.sqrt.market+z.tr.pop.size+ac.term||species)
53	abundance~z.taboo+z.tr.pop.size+ ac.term+offset(log(transect.length))+ (1+ac.term||transect.ID)+(1+z.taboo+z.tr.pop.size+ac.term||species)
54	abundance~z.hunter+z.sqrt.market+z.taboo+ ac.term+offset(log(transect.length))+ (1+ac.term||transect.ID)+(1+z.hunter+z.sqrt.market+z.taboo+ac.term||species)
55	abundance~z.sqrt.market+z.taboo+z.tr.pop.size+ ac.term+offset(log(transect.length))+ (1+ac.term||transect.ID)+(1+z.sqrt.market+z.taboo+z.tr.pop.size+ac.term||species)

A3.2 Model formulas of all zero inflated negative binomial regression models in the model set used for the model selection analysis on chimpanzee abundance in R.

1	abundance~1+z.ndvi+z.sqrt.dist.field+z.sqrt.dist.river+z.sqrt.dist.roads+z.percent.protected+ offset(log(transect.length))| 1+z.ndvi+z.sqrt.dist.field+z.sqrt.dist.river+z.sqrt.dist.roads+z.percent.protected+ offset(log(1/transect.length))
2	abundance~1+z.sqrt.market+z.ndvi+z.sqrt.dist.field+z.sqrt.dist.river+z.sqrt.dist.roads+ z.percent.protected+offset(log(transect.length))| 1+z.sqrt.market+z.ndvi+z.sqrt.dist.field+z.sqrt.dist.river+z.sqrt.dist.roads+z.percent.protected+ offset(log(1/transect.length))
3	abundance~1+z.hunter+z.ndvi+z.sqrt.dist.field+z.sqrt.dist.river+z.sqrt.dist.roads+ z.percent.protected+offset(log(transect.length))| 1+z.hunter+z.ndvi+z.sqrt.dist.field+z.sqrt.dist.river+z.sqrt.dist.roads+z.percent.protected+ offset(log(1/transect.length))
4	abundance~1+z.fisher+z.ndvi+z.sqrt.dist.field+z.sqrt.dist.river+z.sqrt.dist.roads+ z.percent.protected+offset(log(transect.length))| 1+z.fisher+z.ndvi+z.sqrt.dist.field+z.sqrt.dist.river+z.sqrt.dist.roads+z.percent.protected+ offset(log(1/transect.length))
5	abundance~1+z.taboo+z.ndvi+z.sqrt.dist.field+z.sqrt.dist.river+z.sqrt.dist.roads+ z.percent.protected+offset(log(transect.length))| 1+z.taboo+z.ndvi+z.sqrt.dist.field+z.sqrt.dist.river+z.sqrt.dist.roads+z.percent.protected+ offset(log(1/transect.length))
6	abundance~1+z.tr.pop.size+z.ndvi+z.sqrt.dist.field+z.sqrt.dist.river+z.sqrt.dist.roads+ z.percent.protected+offset(log(transect.length))| 1+z.tr.pop.size+z.ndvi+z.sqrt.dist.field+z.sqrt.dist.river+z.sqrt.dist.roads+z.percent.protected+ offset(log(1/transect.length))
7	abundance~1+z.hunter+z.sqrt.market+z.ndvi+z.sqrt.dist.field+z.sqrt.dist.river+z.sqrt.dist.roads+ z.percent.protected+offset(log(transect.length))| 1+z.hunter+z.sqrt.market+z.ndvi+z.sqrt.dist.field+z.sqrt.dist.river+z.sqrt.dist.roads+ z.percent.protected+offset(log(1/transect.length))
8	abundance~1+z.sqrt.market+z.tr.pop.size+z.ndvi+z.sqrt.dist.field+z.sqrt.dist.river+ z.sqrt.dist.roads+z.percent.protected+offset(log(transect.length))| 1+z.sqrt.market+z.tr.pop.size+z.ndvi+z.sqrt.dist.field+z.sqrt.dist.river+z.sqrt.dist.roads+

	z.percent.protected+offset(log(1/transect.length))
9	abundance~1+offset(log(transect.length))|1+offset(log(1/transect.length))
10	abundance~1+z.sqrt.market+offset(log(transect.length))|1+z.sqrt.market+ offset(log(1/transect.length))
11	abundance~1+z.hunter+offset(log(transect.length))|1+z.hunter+offset(log(1/transect.length))
12	abundance~1+z.fisher+offset(log(transect.length))|1+z.fisher+offset(log(1/transect.length))
13	abundance~1+z.taboo+offset(log(transect.length))|1+z.taboo+offset(log(1/transect.length))
14	abundance~1+z.tr.pop.size+offset(log(transect.length))|1+z.tr.pop.size+ offset(log(1/transect.length))
15	abundance~1+z.hunter+z.sqrt.market+offset(log(transect.length))|1+z.hunter+z.sqrt.market+ offset(log(1/transect.length))
16	abundance~1+z.sqrt.market+z.tr.pop.size+offset(log(transect.length))|1+z.sqrt.market+ z.tr.pop.size+offset(log(1/transect.length))