

张梦, 曹荣军, 王功劳, 邹琼玖, 吴林庭, 付伟昌, 周友兵, 彭刚志 (2026) 道路干扰对偶蹄类动物的影响: 以湖北大老岭国家级自然保护区为例. 生物多样性, 34, 26050. doi: 10.17520/biods.2026050; cstr: 32101.14.biods.2026050.

附录 1 湖北大老岭国家级自然保护区 388 台红外相机数据
Appendix 1 388 camera trap sites in Hubei Dalaoiling National Nature Reserve

序号 Number	相机名 Camera_id	纬度 Latitude	经度 Longitude	距 S287 距离 distance_to_S287_m	开始录制日期 first_date	结束录制日期 last_date
1	HBNR016X-DLL304-20210317	31.09	110.95	212.9	2021/3/17	2021/8/31
2	HBNR016X-DLL305-20210317	31.10	110.96	163.2	2021/3/17	2021/8/31
3	HBNR016X-DLL309-20210325	31.11	110.95	66.2	2021/3/25	2021/8/31
4	HBNR016X-DLL005-20210422	31.09	110.99	2604.5	2021/4/22	2021/8/31
5	HBNR016X-DLL011-20210421	31.09	110.95	39.7	2021/4/21	2021/8/31
6	HBNR016X-DLL021-20210420	31.08	110.94	584.0	2021/4/20	2021/8/31
7	HBNR016X-DLL301-20210316	31.09	110.96	94.7	2021/3/16	2021/8/31
8	HBNR016X-DLL302-20210316	31.09	110.97	630.4	2021/3/15	2021/9/1
9	HBNR016X-DLL303-20210317	31.09	110.95	163.6	2021/3/17	2021/8/31
10	HBNR016X-DLL306-20210317	31.10	110.96	375.3	2021/3/17	2021/9/2
11	HBNR016X-DLL102-20201223	31.09	110.93	1843.5	2020/12/23	2021/9/9
12	HBNR016X-DLL103-20201223	31.09	110.93	1538.3	2020/12/23	2021/9/2
13	HBNR016X-DLL105-20210429	31.08	110.98	2115.6	2021/4/29	2021/9/2
14	HBNR016X-DLL106-20210429	31.08	110.97	1643.0	2021/4/29	2021/8/6
15	HBNR016X-DLL107-20210105	31.06	110.96	1435.4	2021/1/5	2021/4/6
16	HBNR016X-DLL001-20210421	31.11	110.95	273.2	2021/4/19	2021/8/7
17	HBNR016X-DLL026-20210602	31.07	110.93	138.6	2021/6/2	2021/9/2
18	HBNR016X-DLL104-20210429	31.08	110.99	2931.2	2021/4/29	2021/9/2

19	HBNR016X-DLL310-20210325	31.12	110.93	1642.6	2021/3/24	2021/9/7
20	HBNR016X-DLL311-20210325	31.11	110.93	1057.4	2021/3/25	2021/9/8
21	HBNR016X-DLL312-20210419	31.11	110.92	2172.8	2021/4/19	2021/9/8
22	HBNR016X-DLL313-20210330	31.12	110.94	799.4	2021/3/30	2021/9/8
23	HBNR016X-DLL314-20210330	31.12	110.94	820.0	2021/3/30	2021/9/8
24	HBNR016X-DLL315-20210421	31.08	110.95	143.4	2021/4/21	2021/9/2
25	HBNR016X-DLL317-20210422	31.11	110.94	568.9	2021/4/20	2021/9/6
26	HBNR016X-DLL318-20210422	31.11	110.94	410.0	2021/4/22	2021/9/8
27	HBNR016X-DLL319-20210601	31.11	110.93	893.5	2021/6/1	2021/9/9
28	HBNR016X-DLL107-20210429	31.06	110.96	1435.4	2021/4/29	2021/8/31
29	HBNR016X-DLL108-20210422	31.06	110.94	251.8	2021/4/22	2021/9/1
30	HBNR016X-DLL109-20210422	31.06	110.94	6.6	2021/4/22	2021/9/1
31	HBNR016X-DLL116-20210413	31.09	110.91	1683.3	2021/4/13	2021/9/2
32	HBNR016X-DLL118-20210413	31.08	110.93	309.9	2021/4/13	2021/9/1
33	HBNR016X-DLL119-20210413	31.06	110.95	418.1	2021/4/13	2021/9/2
34	HBNR016X-DLL120-20210413	31.06	110.95	225.1	2021/4/14	2021/9/3
35	HBNR016X-DLL121-20210415	31.06	110.92	544.4	2021/4/15	2021/9/8
36	HBNR016X-DLL122-20210415	31.05	110.92	1402.5	2021/4/15	2021/9/8
37	HBNR016X-DLL123-20210415	31.05	110.92	1198.8	2021/4/15	2021/9/8
38	HBNR016X-DLL124-20210415	31.07	110.94	587.9	2021/4/15	2021/9/2
39	HBNR016X-DLL125-20210415	31.07	110.94	702.4	2021/4/15	2021/9/2
40	HBNR016X-DLL126-20210415	31.06	110.93	2.2	2021/4/15	2021/9/2
41	HBNR016X-DLL127-20210427	31.09	110.93	1206.5	2021/4/27	2021/9/1
42	HBNR016X-DLL201-20210413	31.05	110.95	248.5	2021/4/13	2021/9/8
43	HBNR016X-DLL202-20210413	31.05	110.95	31.7	2021/3/14	2021/8/2

44	HBNR016X-DLL205-20210415	31.05	110.96	716.7	2021/4/15	2021/8/31
45	HBNR016X-DLL206-20210416	31.06	110.96	1074.7	2021/4/16	2021/9/1
46	HBNR016X-DLL207-20210421	31.06	110.97	2195.1	2021/4/21	2021/8/6
47	HBNR016X-DLL128-20210601	31.08	110.91	1689.2	2021/6/1	2021/10/26
48	HBNR016X-DLL009-20191029	31.09	110.92	2271.5	2019/3/17	2020/4/21
49	HBNR016X-DLL011-20191212	31.09	110.92	2209.8	2020/1/1	2020/4/21
50	HBNR016X-DLL012-20191029	31.07	110.92	428.8	2020/1/1	2020/4/21
51	HBNR016X-WZY001-20240126	31.06	110.95	404.4	2024/1/26	2024/5/14
52	HBNR016X-WZY003-20240126	31.06	110.93	11.2	2024/1/26	2024/5/14
53	HBNR016X-WZY004-20240128	31.07	110.93	52.0	2023/1/28	2024/5/14
54	HBNR016X-WZY005-20240126	31.07	110.93	52.0	2024/1/26	2024/5/16
55	HBNR016X-WZY006-20240127	31.06	110.94	283.1	2024/1/27	2024/5/13
56	HBNR016X-WZY007-20240126	31.07	110.94	594.7	2024/1/26	2024/5/16
57	HBNR016X-WZY009-20240126	31.08	110.97	1723.0	2024/1/26	2024/5/16
58	HBNR016X-WZY011-20240126	31.07	110.98	2213.3	2024/1/26	2024/5/15
59	HBNR016X-WZY012-20240127	31.08	110.95	449.1	2024/1/27	2024/5/15
60	HBNR016X-WZY015-20240127	31.09	110.97	936.7	2024/1/27	2024/4/28
61	HBNR016X-WZY016-20240127	31.10	110.97	817.1	2024/1/27	2024/5/14
62	HBNR016X-WZY017-20240127	31.10	110.96	358.8	2024/1/27	2024/5/14
63	HBNR016X-D4G002-20231101	31.10	110.97	878.0	2023/11/1	2024/3/29
64	HBNR016X-D4G007-20231227	31.10	110.97	947.8	2023/12/27	2024/5/15
65	HBNR016X-D4G038-20231117	31.08	110.97	1176.1	2023/11/17	2024/3/8
66	HBNR016X-DLL001-20230803	31.11	110.95	387.3	2023/8/3	2023/12/7
67	HBNR016X-DLL001-20231207	31.11	110.95	387.4	2023/12/7	2024/5/21
68	HBNR016X-DLL002-20230801	31.09	110.95	28.6	2023/8/1	2023/12/5

69	HBNR016X-DLL002-20231205	31.09	110.95	50.5	2023/12/5	2024/5/14
70	HBNR016X-DLL003-20240808	31.12	110.94	374.7	2023/8/8	2023/11/24
71	HBNR016X-DLL004-20231207	31.11	110.95	279.1	2023/12/7	2024/5/21
72	HBNR016X-DLL005-20230801	31.08	110.95	554.1	2023/8/1	2023/12/5
73	HBNR016X-DLL005-20231205	31.08	110.95	551.5	2023/12/5	2024/3/11
74	HBNR016X-DLL008-20230808	31.12	110.95	271.5	2023/8/8	2023/11/17
75	HBNR016X-DLL008-20230809	31.07	110.94	401.7	2023/8/9	2024/3/12
76	HBNR016X-DLL010-20231102	31.08	110.99	2734.4	2023/11/2	2024/5/16
77	HBNR016X-DLL011-20230809	31.09	110.97	1170.7	2023/8/9	2024/1/4
78	HBNR016X-DLL012-20230809	31.09	110.97	656.9	2023/8/9	2024/1/4
79	HBNR016X-DLL012-20240104	31.09	110.97	659.7	2024/1/4	2024/5/21
80	HBNR016X-DLL013-20230808	31.12	110.94	370.3	2023/8/8	2023/12/6
81	HBNR016X-DLL058-20231117	31.08	110.99	2916.4	2023/11/17	2024/5/15
82	HBNR016X-DLL059-20231117	31.08	110.98	2119.0	2023/11/17	2024/5/16
83	HBNR016X-DLL435-20231228	31.10	110.96	313.2	2023/12/28	2024/5/13
84	HBNR016X-DLL438-20230801	31.09	110.95	23.8	2023/8/1	2023/11/11
85	HBNR016X-QJY002-20240104	31.09	110.97	1165.0	2024/1/4	2024/5/21
86	HBNR016X-QJYT08-20231227	31.10	110.97	947.8	2023/12/27	2024/5/15
87	HBNR016X-DLL015-20231206	31.09	110.92	2009.8	2023/12/6	2024/4/18
88	HBNR016X-DLL018-20231206	31.08	110.93	809.9	2023/12/6	2024/5/6
89	HBNR016X-DLL019-20231207	31.05	110.95	10.6	2023/12/7	2024/6/12
90	HBNR016X-DLL021-20231205	31.08	110.93	785.8	2023/12/5	2024/5/6
91	HBNR016X-DLL022-20231206	31.09	110.91	2305.2	2023/12/6	2024/4/18
92	HBNR016X-DLL023-20231206	31.08	110.92	899.0	2023/12/6	2024/5/9
93	HBNR016X-DLL024-20230626	31.06	110.92	626.8	2023/6/26	2024/3/13

94	HBNR016X-DLL025-20230626	31.06	110.92	618.9	2023/6/26	2023/10/23
95	HBNR016X-DLL028-20241121	31.06	110.95	419.9	2023/11/21	2024/3/19
96	HBNR016X-DLL040-20231101	31.09	110.92	1503.7	2023/11/1	2024/5/23
97	HBNR016X-DLL052-20231101	31.09	110.93	1705.3	2023/11/1	2024/4/9
98	HBNR016X-DLL053-20231101	31.09	110.93	1725.1	2023/11/1	2024/4/9
99	HBNR016X-DLL054-20231101	31.09	110.93	1710.6	2023/11/1	2024/4/8
100	HBNR016X-DLL055-20231101	31.09	110.93	1885.2	2023/11/1	2024/4/9
101	HBNR016X-DLL056-20231101	31.09	110.93	1802.5	2023/11/1	2024/4/9
102	HBNR016X-DLL061-20231129	31.07	110.92	100.5	2023/11/29	2024/5/8
103	HBNR016X-DLL062-20231129	31.07	110.92	11.1	2023/11/29	2024/5/8
104	HBNR016X-DLL064-20231129	31.08	110.91	1059.7	2023/12/23	2024/5/8
105	HBNR016X-DLL065-20231129	31.07	110.91	749.8	2023/11/29	2024/5/7
106	HBNR016X-DLL066-20231129	31.07	110.91	667.2	2023/11/29	2024/5/8
107	HBNR016X-DLL067-20231129	31.07	110.91	1047.4	2023/11/29	2024/5/8
108	HBNR016X-DLL069-20230711	31.07	110.92	65.6	2023/7/11	2024/1/9
109	HBNR016X-DLL151-20230918	31.07	110.94	682.8	2023/9/18	2024/3/20
110	HBNR016X-DLL152-20230918	31.07	110.93	233.5	2023/9/18	2024/3/20
111	HBNR016X-DLL154-20231009	31.08	110.93	433.3	2023/10/9	2024/5/8
112	HBNR016X-DLL155-20231024	31.08	110.93	865.7	2023/10/24	2024/5/23
113	HBNR016X-DLL160-20231123	31.04	110.91	2582.4	2023/11/23	2024/7/24
114	HBNR016X-DLL163-20231123	31.05	110.92	1552.4	2023/11/23	2024/7/24
115	HBNR016X-DLLT07-20231024	31.11	110.94	364.8	2023/10/24	2024/5/23
116	HBNR016X-W4G005-20240111	31.09	110.93	1884.5	2024/1/11	2024/5/6
117	HBNR016X-D4G203-20231230	31.04	110.95	83.9	2023/12/30	2024/6/25
118	HBNR016X-DLL027-20231121	31.06	110.95	419.9	2023/11/21	2024/3/19

119	HBNR016X-DLL028-20231121	31.06	110.95	419.9	2023/11/21	2024/3/19
120	HBNR016X-DLL030-20231101	31.06	110.96	1316.4	2023/11/1	2024/3/14
121	HBNR016X-DLL032-20231121	31.06	110.95	452.2	2023/11/21	2024/3/19
122	HBNR016X-DLL034-20231101	31.06	110.96	1311.7	2023/11/1	2024/3/14
123	HBNR016X-DLL039-20230428	31.06	110.92	179.6	2023/4/28	2024/3/18
124	HBNR016X-DLL041-20231121	31.03	110.94	1191.4	2023/11/21	2024/6/19
125	HBNR016X-DLL045-20231121	31.03	110.94	1593.1	2023/11/21	2024/6/19
126	HBNR016X-DLL046-20231121	31.03	110.93	2514.6	2023/11/21	2024/5/7
127	HBNR016X-DLL421-20231121	31.03	110.93	2503.1	2023/11/21	2024/5/7
128	HBNR016X-DLL426-20230727	31.06	110.97	1915.4	2023/7/27	2024/3/6
129	HBNR016X-DLLT01-20231121	31.03	110.94	1580.9	2023/11/21	2024/3/30
130	HBNR016X-DLL008-20240409	31.09	110.93	1718.5	2024/4/9	2024/10/23
131	HBNR016X-WZS006-20240409	31.09	110.93	1803.5	2024/4/9	2024/9/9
132	HBNR016X-WZS007-20240409	31.09	110.93	1723.3	2024/4/9	2024/10/24
133	HBNR016X-WZS009-20240409	31.09	110.93	1709.4	2024/4/9	2024/7/18
134	HBNR016X-WZS014-20231205	31.06	110.94	285.8	2023/12/5	2024/6/12
135	HBNR016X-WZS025-20241207	31.09	110.91	1788.5	2023/12/7	2024/9/3
136	HBNR016X-WZY001-20240514	31.06	110.95	404.4	2024/5/14	2024/8/29
137	HBNR016X-WZY002-20240514	31.06	110.95	333.9	2024/5/14	2024/8/29
138	HBNR016X-WZY003-20240515	31.06	110.93	11.2	2024/5/15	2024/8/29
139	HBNR016X-WZY004-20240515	31.07	110.93	52.0	2023/5/15	2023/8/30
140	HBNR016X-WZY005-20240516	31.08	110.93	306.9	2024/5/16	2024/8/14
141	HBNR016X-WZY007-20240516	31.08	110.94	224.0	2024/5/16	2024/8/29
142	HBNR016X-WZY008-20240516	31.08	110.97	1642.2	2024/5/16	2024/8/28
143	HBNR016X-WZY009-20240516	31.08	110.97	1723.0	2024/5/16	2024/8/28

144	HBNR016X-WZY010-20240516	31.08	110.98	2117.5	2024/5/16	2024/8/29
145	HBNR016X-WZY011-20240514	31.07	110.98	2213.3	2024/5/14	2024/8/28
146	HBNR016X-WZY011-20240515	31.07	110.98	2213.3	2024/5/15	2024/8/28
147	HBNR016X-WZY012-20240515	31.08	110.95	449.1	2024/5/15	2024/8/28
148	HBNR016X-WZY013-20240515	31.08	110.95	263.3	2024/5/15	2024/8/28
149	HBNR016X-WZY016-20240514	31.10	110.97	819.7	2024/5/14	2024/8/28
150	HBNR016X-WZY017-20240514	31.10	110.96	358.8	2024/5/14	2024/8/28
151	HBNR016X-WZY018-20240515	31.08	110.94	330.6	2024/5/15	2024/8/29
152	HBNR016X-WZY020-20240516	31.04	110.95	81.5	2024/5/16	2024/8/29
153	HBNR016X-DLLT07-20230110	31.08	110.91	1867.8	2023/1/10	2023/4/20
154	HBNR016X-DLL025-20230111	31.05	110.91	2202.5	2023/1/11	2023/4/26
155	HBNR016X-DLL023-20221129	31.09	110.93	1472.8	2022/11/29	2023/4/13
156	HBNR016X-DLL022-20221206	31.08	110.91	1768.4	2022/12/6	2023/4/20
157	HBNR016X-DLL021-20221123	31.09	110.92	1817.7	2022/11/23	2023/4/13
158	HBNR016X-DLL020-20221123	31.09	110.92	1817.7	2022/11/23	2023/4/13
159	HBNR016X-DLL019-20221122	31.09	110.93	1375.4	2022/11/22	2023/4/24
160	HBNR016X-DLL018-20221122	31.09	110.92	1899.6	2022/11/22	2023/4/24
161	HBNR016X-DLL016-20221117	31.08	110.93	329.3	2022/11/17	2023/4/13
162	HBNR016X-DLL012-20221220	31.11	110.94	479.1	2022/12/20	2023/5/29
163	HBNR016X-DLL011-20221220	31.11	110.95	396.1	2022/12/20	2023/5/30
164	HBNR016X-DLLT05-20221220	31.11	110.95	396.1	2022/12/20	2023/6/13
165	HBNR016X-DLL010-20221129	31.09	110.97	1157.7	2022/11/29	2023/5/18
166	HBNR016X-DLL009-20221129	31.09	110.97	1163.0	2022/11/29	2023/5/31
167	HBNR016X-DLL008-20221129	31.08	110.96	563.1	2022/11/29	2023/5/30
168	HBNR016X-DLL007-20221129	31.08	110.96	666.9	2022/11/29	2023/5/18

169	HBNR016X-DLL005-20221129	31.10	110.96	342.7	2022/11/29	2023/5/31
170	HBNR016X-DLL003-20221129	31.10	110.97	817.1	2022/11/29	2023/5/29
171	HBNR016X-DLL002-20221129	31.10	110.97	755.1	2022/11/29	2023/5/18
172	HBNR016X-DLL027-20221110	31.06	110.95	419.9	2022/11/10	2023/4/14
173	HBNR016X-DLL028-20221110	31.06	110.95	419.9	2022/11/10	2023/4/18
174	HBNR016X-DLL033-20221117	31.06	110.95	396.9	2022/11/17	2023/4/10
175	HBNR016X-DLL034-20221117	31.06	110.95	431.1	2022/11/17	2023/6/7
176	HBNR016X-DLL039-20221127	31.06	110.92	179.6	2022/11/27	2023/4/24
177	HBNR016X-DLL045-20221115	31.09	110.97	970.6	2022/11/15	2023/6/12
178	HBNR016X-DLL047-20221128	31.06	110.96	1416.1	2022/11/28	2023/8/1
179	HBNR016X-DLL189-20221101	31.09	110.93	1698.2	2022/11/1	2023/5/4
180	HBNR016X-DLL101-20221101	31.09	110.93	1725.4	2022/11/1	2023/2/16
181	HBNR016X-DLL128-20221101	31.09	110.93	1723.3	2022/11/1	2023/6/7
182	HBNR016X-DLL124-20221101	31.09	110.93	1884.7	2022/11/1	2023/6/7
183	HBNR016X-DLL117-20221101	31.09	110.93	1805.4	2022/11/1	2023/6/7
184	HBNR016X-DLL116-20221108	31.07	110.92	106.3	2022/11/8	2023/4/11
185	HBNR016X-DLL120-20221108	31.07	110.92	65.6	2022/11/8	2023/7/11
186	HBNR016X-DLL306-20221108	31.07	110.92	220.4	2022/11/9	2023/4/1
187	HBNR016X-DLL401-20221109	31.07	110.92	146.5	2022/11/9	2023/6/13
188	HBNR016X-DLL115-20221109	31.07	110.92	129.6	2022/11/9	2023/6/13
189	HBNR016X-DLL402-20221109	31.07	110.92	130.1	2022/11/9	2023/6/13
190	HBNR016X-DLL105-20221109	31.07	110.92	219.3	2022/11/8	2023/6/12
191	HBNR016X-DLL111-20221109	31.07	110.92	508.9	2022/11/9	2023/6/13
192	HBNR016X-DLL112-20221109	31.07	110.92	316.2	2022/11/9	2023/6/13
193	HBNR016X-DLL040-20221110	31.09	110.92	1503.7	2022/11/10	2023/6/7

194	HBNR016X-DLL041-20221115	31.08	110.94	3.8	2022/11/15	2023/3/24
195	HBNR016X-DLL043-20221115	31.08	110.94	76.2	2022/11/15	2023/6/9
196	HBNR016X-DLL042-20221115	31.08	110.94	78.2	2022/11/15	2023/6/9
197	HBNR016X-DLL040-20230607	31.09	110.92	1498.4	2023/6/7	2023/11/1
198	HBNR016X-DLL052-20230607	31.09	110.93	1709.4	2023/6/7	2023/11/1
199	HBNR016X-DLL053-20230607	31.09	110.93	1721.1	2023/6/7	2023/11/1
200	HBNR016X-DLL054-20230607	31.09	110.93	1710.7	2023/6/7	2023/11/1
201	HBNR016X-DLL055-20230607	31.09	110.93	1889.3	2023/6/7	2023/11/1
202	HBNR016X-DLL058-20230608	31.08	110.99	2920.2	2023/6/8	2023/11/17
203	HBNR016X-DLL059-20230608	31.08	110.98	2118.1	2023/6/8	2023/10/28
204	HBNR016X-DLL061-20230613	31.07	110.92	117.6	2023/6/13	2023/11/29
205	HBNR016X-DLL062-20230613	31.07	110.92	14.1	2023/6/13	2023/11/29
206	HBNR016X-DLL065-20230613	31.07	110.92	222.0	2023/6/13	2023/11/29
207	HBNR016X-DLL066-20230613	31.07	110.92	297.4	2023/6/13	2023/11/29
208	HBNR016X-DLL067-20230613	31.07	110.92	507.2	2023/6/13	2023/11/29
209	HBNR016X-DLL041-20230712	31.03	110.94	1191.4	2023/7/12	2023/11/21
210	HBNR016X-DLL045-20230713	31.03	110.94	1590.5	2023/7/13	2023/11/21
211	HBNR016X-DLL027-20230418	31.06	110.95	402.2	2023/4/18	2023/11/21
212	HBNR016X-DLL028-20230418	31.06	110.95	343.4	2023/4/18	2023/11/14
213	HBNR016X-DLL009-20230808	31.11	110.95	279.3	2023/8/8	2023/12/6
214	HBNR016X-DLL003-20230808	31.12	110.95	268.8	2023/8/8	2023/11/24
215	HBNR016X-DLL030-20230613	31.07	110.96	1051.4	2023/6/13	2023/11/1
216	HBNR016X-DLL034-20230613	31.07	110.96	1051.4	2023/6/13	2023/11/1
217	HBNR016X-DLL046-20230706	31.03	110.93	2508.1	2023/7/6	2023/11/21
218	HBNR016X-DLLT02-20230706	31.03	110.93	2494.8	2023/7/6	2023/11/21

219	HBNR016X-DLL301-20210831	31.09	110.96	94.7	2021/8/31	2022/3/9
220	HBNR016X-DLL312-20210909	31.09	110.96	229.1	2021/9/9	2022/3/13
221	HBNR016X-DLL315-20210902	31.08	110.95	143.4	2021/9/2	2022/1/16
222	HBNR016X-DLL105-20211224	31.08	110.98	2115.6	2020/12/24	2021/4/29
223	HBNR016X-DLL107-20210831	31.06	110.96	1435.4	2021/8/31	2022/1/17
224	HBNR016X-DLL007-20201112	31.06	110.95	179.2	2020/11/12	2021/6/29
225	HBNR016X-DLL008-20201112	31.09	110.99	2965.3	2020/11/12	2021/12/14
226	HBNR016X-DLL010-20201112	31.09	110.93	1538.3	2020/11/12	2021/11/23
227	HBNR016X-DLL016-20211102	31.07	110.92	584.6	2021/11/2	2022/2/6
228	HBNR016X-DLL021-20210907	31.08	110.95	132.7	2021/9/7	2021/12/23
229	HBNR016X-DLL321-20211116	31.09	110.99	2965.3	2021/11/6	2022/3/28
230	HBNR016X-DLL324-20211117	31.06	110.98	2931.1	2021/11/17	2022/3/4
231	HBNR016X-DLL110-20220316	31.06	110.95	119.4	2022/3/16	2022/6/22
232	HBNR016X-DLL072-20220301	31.04	110.95	289.9	2022/3/1	2022/6/8
233	HBNR016X-DLL201-20220308	31.04	110.95	10.9	2022/3/8	2022/6/16
234	HBNR016X-DLL105-20220407	31.08	110.97	1674.3	2022/4/7	2022/8/9
235	HBNR016X-DLL001-20210908	31.11	110.94	312.2	2021/9/8	2022/4/5
236	HBNR016X-DLL020-20210907	31.09	110.96	101.2	2021/9/7	2022/1/9
237	HBNR016X-DLL028-20210909	31.10	110.97	515.7	2021/9/9	2022/4/6
238	HBNR016X-DLL302-20210902	31.09	110.97	626.9	2021/9/2	2022/4/11
239	HBNR016X-DLL303-20210831	31.09	110.95	163.6	2021/8/31	2022/5/11
240	HBNR016X-DLL304-20210831	31.09	110.95	212.9	2021/8/31	2022/5/12
241	HBNR016X-DLL305-20210831	31.10	110.96	163.2	2021/8/31	2022/4/11
242	HBNR016X-DLL306-20210902	31.10	110.96	375.3	2021/9/2	2022/4/11
243	HBNR016X-DLL307-20210907	31.08	110.94	580.6	2021/9/7	2022/5/12

244	HBNR016X-DLL308-20210907	31.10	110.96	82.2	2021/9/7	2022/4/11
245	HBNR016X-DLL309-20210831	31.11	110.95	66.2	2021/8/31	2022/5/17
246	HBNR016X-DLL310-20210908	31.12	110.93	1521.0	2021/9/8	2022/3/30
247	HBNR016X-DLL317-20210908	31.11	110.94	568.9	2021/9/8	2022/5/16
248	HBNR016X-DLL318-20210908	31.11	110.94	410.0	2021/9/8	2022/5/16
249	HBNR016X-DLL319-20210909	31.10	110.96	430.0	2021/9/9	2022/4/10
250	HBNR016X-DLL111-20220407	31.07	110.91	1046.7	2022/4/7	2022/9/28
251	HBNR016X-DLL112-20211123	31.07	110.92	230.5	2021/11/23	2022/4/7
252	HBNR016X-DLL115-20211123	31.07	110.92	159.8	2021/11/23	2022/4/7
253	HBNR016X-DLL104-20201224	31.08	110.97	1589.9	2020/12/24	2021/4/29
254	HBNR016X-DLL105-20201224	31.08	110.98	2115.6	2020/12/24	2021/4/29
255	HBNR016X-DLL101-20211203	31.06	110.93	664.3	2021/12/3	2022/3/16
256	HBNR016X-DLL125-20211123	31.07	110.93	141.1	2021/11/23	2022/3/16
257	HBNR016X-DLL117-20211207	31.09	110.93	1510.8	2021/12/7	2022/3/15
258	HBNR016X-DLL128-20211207	31.09	110.93	1520.8	2021/12/7	2022/3/15
259	HBNR016X-DLL123-20211123	31.09	110.93	1172.5	2021/11/23	2022/3/15
260	HBNR016X-DLL103-20211207	31.08	110.91	1444.6	2021/12/7	2022/3/8
261	HBNR016X-DLL113-20211207	31.08	110.92	1439.5	2021/12/7	2022/3/8
262	HBNR016X-DLL210-20210926	31.06	110.96	1309.4	2021/9/26	2022/1/17
263	HBNR016X-DLL190-20220118	31.07	110.92	211.9	2022/1/18	2022/4/26
264	HBNR016X-DLL116-20220426	31.07	110.92	324.3	2022/4/26	2022/10/31
265	HBNR016X-DLL112-20220407	31.07	110.91	840.3	2022/4/7	2022/11/4
266	HBNR016X-DLL111-20211123	31.07	110.91	555.4	2021/11/23	2022/4/7
267	HBNR016X-DLL105-20211202	31.08	110.99	2469.5	2021/12/2	2022/4/7
268	HBNR016X-DLL104-20220407	31.08	110.97	1589.9	2022/4/7	2022/8/6

269	HBNR016X-DLL121-20220407	31.08	110.97	1203.7	2022/4/7	2022/7/22
270	HBNR016X-DLL126-20220407	31.08	110.97	1203.7	2022/4/7	2022/10/12
271	HBNR016X-DLL127-20220407	31.08	110.97	1203.7	2022/4/7	2022/9/16
272	HBNR016X-DLL101-20220316	31.06	110.93	664.3	2022/3/16	2022/9/28
273	HBNR016X-DLL106-20220316	31.06	110.92	258.6	2022/3/16	2022/9/28
274	HBNR016X-DLL122-20220316	31.07	110.94	283.0	2022/3/16	2022/9/28
275	HBNR016X-DLL123-20220315	31.09	110.93	1172.5	2022/3/15	2022/8/21
276	HBNR016X-DLL103-20220308	31.08	110.91	1444.6	2022/3/8	2022/9/22
277	HBNR016X-DLL113-20220308	31.08	110.92	1439.5	2022/3/8	2022/9/22
278	HBNR016X-DLL117-20220315	31.09	110.93	1510.8	2022/3/15	2022/6/25
279	HBNR016X-DLL128-20220315	31.09	110.93	1520.8	2022/3/15	2022/8/28
280	HBNR016X-DLL402-20220407	31.07	110.91	672.4	2022/4/7	2022/11/9
281	HBNR016X-DLL072-20220608	31.04	110.95	289.9	2022/6/8	2022/9/27
282	HBNR016X-DLL109-20220608	31.06	110.94	56.9	2022/6/8	2022/9/22
283	HBNR016X-DLL071-20220608	31.04	110.95	283.3	2022/6/8	2022/9/27
284	HBNR016X-DLL189-20220609	31.09	110.92	2205.3	2022/6/9	2022/10/1
285	HBNR016X-DLL124-20220609	31.09	110.92	2370.5	2022/6/9	2022/11/1
286	HBNR016X-DLL026-20220609	31.09	110.92	2370.5	2022/6/9	2022/11/1
287	HBNR016X-DLL008-20220609	31.09	110.92	2304.8	2022/6/9	2022/10/6
288	HBNR016X-DLL190-20220609	31.08	110.94	370.4	2022/6/9	2022/11/15
289	HBNR016X-DLL307-20220512	31.08	110.94	541.6	2022/5/12	2022/9/26
290	HBNR016X-DLL304-20220512	31.09	110.95	225.0	2022/5/12	2022/8/10
291	HBNR016X-DLL020-20220607	31.09	110.97	583.4	2022/6/7	2022/9/26
292	HBNR016X-DLL319-20220511	31.10	110.97	459.0	2022/5/11	2022/9/26
293	HBNR016X-DLL028-20220406	31.10	110.97	511.4	2022/4/6	2022/9/14

294	HBNR016X-DLL308-20220411	31.10	110.96	119.5	2022/4/11	2022/9/26
295	HBNR016X-DLL305-20220411	31.10	110.96	119.5	2022/4/11	2022/9/24
296	HBNR016X-DLL309-20220517	31.11	110.95	47.4	2022/5/17	2022/9/26
297	HBNR016X-DLL311-20220516	31.12	110.95	256.9	2022/5/16	2022/9/27
298	HBNR016X-DLL315-20220317	31.08	110.95	134.6	2022/3/17	2022/7/26
299	HBNR016X-DLL110-20220622	31.06	110.95	119.4	2022/6/22	2022/9/22
300	HBNR016X-DLL421-20221011	31.08	110.93	273.5	2022/10/11	2023/6/9
301	HBNR016X-WZS157-20241205	31.05	110.92	1124.1	2023/12/5	2024/12/5
302	HBNR016X-D4G008-20241227	31.11	110.93	1504.1	2023/12/27	2024/4/14
303	HBNR016X-DLL013-20241206	31.11	110.94	287.9	2023/12/6	2024/5/28
304	HBNR016X-WZS001-20240109	31.06	110.91	1046.9	2024/1/9	2024/8/14
305	HBNR016X-WZS002-20240109	31.06	110.95	161.1	2024/1/9	2024/5/18
306	HBNR016X-DLL049-20241203	31.08	110.93	1101.4	2024/12/3	2025/6/6
307	HBNR016X-DLL051-20241207	31.09	110.93	1193.2	2024/12/7	2025/6/16
308	HBNR016X-W4G001-20240319	31.08	110.91	1198.2	2024/3/19	2025/4/13
309	HBNR016X-WZS003-20240320	31.07	110.94	681.9	2024/3/20	2025/3/6
310	HBNR016X-WZS005-20240909	31.09	110.93	1884.5	2024/9/9	2025/4/21
311	HBNR016X-WZS006-20240909	31.09	110.92	1805.4	2024/9/9	2025/3/20
312	HBNR016X-WZS007-20241030	31.09	110.93	1710.3	2024/10/30	2025/4/22
313	HBNR016X-WZS008-20241024	31.09	110.93	1710.3	2024/10/24	2025/6/25
314	HBNR016X-WZS011-20241202	31.09	110.92	1902.2	2024/12/2	2025/6/11
315	HBNR016X-WZS012-20240506	31.09	110.93	1463.2	2024/5/6	2024/10/5
316	HBNR016X-WZS014-20240508	31.07	110.92	114.5	2024/5/8	2024/11/25
317	HBNR016X-WZS015-20240508	31.07	110.92	14.1	2024/5/8	2025/6/12
318	HBNR016X-WZS016-20240508	31.07	110.92	507.0	2024/5/8	2025/6/12

319	HBNR016X-WZS017-20240508	31.07	110.91	1134.9	2024/5/8	2025/6/11
320	HBNR016X-WZS018-20240508	31.07	110.91	752.3	2024/5/8	2025/6/12
321	HBNR016X-WZS019-20240508	31.08	110.91	1062.7	2024/5/8	2025/6/12
322	HBNR016X-WZS021-20240509	31.08	110.93	419.0	2024/5/9	2025/7/2
323	HBNR016X-WZS022-20240509	31.08	110.93	810.3	2024/5/9	2025/6/18
324	HBNR016X-WZS023-20240509	31.08	110.93	792.4	2024/5/9	2025/6/15
325	HBNR016X-WZS024-20240313	31.08	110.93	865.7	2024/3/13	2025/4/5
326	HBNR016X-WZS024-20240523	31.06	110.92	616.6	2024/5/23	2025/7/3
327	HBNR016X-WZS025-20240523	31.08	110.93	848.1	2024/5/23	2025/7/3
328	HBNR016X-WZS026-20240313	31.06	110.92	528.3	2024/3/13	2024/12/3
329	HBNR016X-WZS029-20240612	31.09	110.93	1275.9	2024/6/12	2024/12/6
330	HBNR016X-WZS030-20240612	31.07	110.91	598.6	2024/6/12	2025/6/10
331	HBNR016X-WZS031-20240723	31.08	110.94	154.4	2024/7/23	2025/7/2
332	HBNR016X-WZS032-20241205	31.05	110.92	1569.7	2024/12/5	2025/6/17
333	HBNR016X-WZS036-20241206	31.08	110.94	313.0	2024/12/6	2025/4/9
334	HBNR016X-WZS037-20240814	31.07	110.92	26.0	2024/8/14	2025/4/21
335	HBNR016X-WZS038-20240814	31.06	110.91	1050.0	2024/8/14	2025/4/10
336	HBNR016X-WZS039-20240814	31.06	110.90	1685.6	2024/8/14	2025/7/5
337	HBNR016X-WZS040-20240904	31.09	110.91	1752.9	2024/9/4	2025/7/1
338	HBNR016X-WZS041-20240903	31.09	110.91	1787.6	2024/9/3	2025/5/23
339	HBNR016X-WZS042-20240909	31.09	110.95	22.1	2024/9/9	2025/4/6
340	HBNR016X-WZS044-20241207	31.09	110.93	1282.4	2024/12/7	2025/5/14
341	HBNR016X-WZS069-20240109	31.07	110.91	460.8	2024/1/9	2025/7/5
342	HBNR016X-WZS156-20241205	31.05	110.91	1683.0	2024/12/5	2025/6/17
343	HBNR016X-WZS020-20240818	31.08	110.93	419.0	2024/8/18	2025/7/2

344	HBNR016X-D4G211-20240716	31.04	110.95	63.0	2024/7/16	2025/2/16
345	HBNR016X-DLL030-20240314	31.06	110.96	1313.2	2024/3/14	2024/11/19
346	HBNR016X-DLL032-20240319	31.06	110.95	453.4	2024/3/19	2025/7/3
347	HBNR016X-DLLT01-20240619	31.03	110.94	1584.0	2024/6/19	2024/9/28
348	HBNR016X-DLL003-20240312	31.12	110.94	374.7	2024/2/12	2024/10/13
349	HBNR016X-QJY003-20240515	31.08	110.95	527.6	2024/5/15	2024/11/11
350	HBNR016X-DLL049-20240618	31.08	110.93	1101.4	2024/6/18	2024/12/3
351	HBNR016X-WZS008-20240409	31.09	110.93	1728.6	2024/4/9	2024/10/23
352	HBNR016X-WZS011-20240418	31.09	110.92	1899.6	2024/4/18	2024/12/2
353	HBNR016X-WZS036-20240806	31.06	110.95	345.9	2024/8/6	2024/12/5
354	HBNR016X-DLL051-20240521	31.09	110.93	1193.2	2024/5/21	2024/10/16
355	HBNR016X-DLL420-20240528	31.08	110.94	311.1	2024/5/28	2024/11/10
356	HBNR016X-DLL438-20240515	31.09	110.95	15.8	2024/5/15	2024/9/1
357	HBNR016X-DLL439-20240515	31.09	110.95	250.1	2024/5/15	2024/8/31
358	HBNR016X-QJY001-20240521	31.09	110.97	1164.1	2024/5/21	2024/11/8
359	HBNR016X-QJY002-20240521	31.09	110.97	1173.8	2024/5/21	2024/12/17
360	HBNR016X-QJY004-20240515	31.09	110.95	51.8	2024/5/15	2024/12/18
361	HBNR016X-QJY009-20240521	31.11	110.95	283.7	2024/5/21	2024/12/18
362	HBNR016X-QJY010-20240521	31.11	110.95	391.0	2024/5/21	2024/12/18
363	HBNR016X-QJY011-20240521	31.09	110.97	662.1	2024/5/21	2024/12/17
364	HBNR016X-QJY013-20240528	31.11	110.94	281.1	2024/5/28	2024/12/19
365	HBNR016X-QJY014-20240528	31.12	110.95	262.5	2024/5/28	2024/12/19
366	HBNR016X-D4G007-20240807	31.10	110.97	1167.7	2024/8/7	2025/2/4
367	HBNR016X-D4G008-20240613	31.11	110.93	1504.1	2024/6/13	2025/3/21
368	HBNR016X-DLL047-20241217	31.09	110.97	958.8	2024/12/17	2025/7/5

369	HBNR016X-DLL436-20240813	31.11	110.93	1084.6	2024/8/13	2025/7/3
370	HBNR016X-DLL437-20240813	31.12	110.93	1067.5	2024/8/13	2024/12/1
371	HBNR016X-DLL438-20241218	31.09	110.95	15.8	2024/12/18	2025/6/12
372	HBNR016X-DLL441-20240516	31.08	110.96	1250.1	2024/5/16	2024/8/14
373	HBNR016X-DLL443-20240515	31.10	110.97	822.2	2024/5/15	2025/6/16
374	HBNR016X-WZY001-20240829	31.06	110.95	404.4	2024/8/29	2025/2/20
375	HBNR016X-WZY005-20240829	31.08	110.93	306.9	2024/8/29	2025/2/19
376	HBNR016X-WZY007-20240829	31.08	110.94	224.0	2024/8/29	2025/1/16
377	HBNR016X-WZY010-20240904	31.04	110.95	111.7	2024/9/4	2025/2/19
378	HBNR016X-WZY012-20240828	31.08	110.95	449.1	2024/8/28	2025/2/19
379	HBNR016X-WZY013-20240828	31.08	110.95	263.3	2024/8/28	2025/1/11
380	HBNR016X-WZY015-20240108	31.09	110.97	954.9	2024/1/8	2025/2/16
381	HBNR016X-WZY016-20240828	31.10	110.97	817.1	2024/8/28	2025/2/18
382	HBNR016X-WZY017-20240828	31.10	110.96	358.8	2024/8/28	2025/1/23
383	HBNR016X-WZY020-20240829	31.09	110.96	216.5	2024/8/29	2025/2/4
384	HBNR016X-QJY012-20240522	31.09	110.93	1592.4	2024/5/22	2025/6/11
385	HBNR016X-QJY013-20241219	31.11	110.94	286.3	2024/12/19	2025/7/2
386	HBNR016X-QJY014-20241219	31.05	110.95	63.7	2024/12/19	2025/7/2
387	HBNR016X-QJYT05-20240613	31.11	110.93	1504.1	2024/6/13	2025/7/6
388	HBNR016X-DLL034-20240505	31.06	110.96	1302.4	2024/5/5	2025/4/8

附录 2 湖北大老岭国家级自然保护区 6 种偶蹄类动物基本信息
Appendix 2 Basic information of six artiodactyl species of Hubei Dalaoling National Nature Reserve

物种 Species	道路影响域阈值 Road effect zone threshold (m)		体重 Body weight(kg)	昼行性 指数 Diurnal- nocturnal index	年产胎数 No.litter/ year	窝仔数 Litter size	数据来源 Date source	繁殖数 Fecundity	家域范围 Home range (km ²)	数据来源 Date Source
	近端 Near	远端 Far								
野猪 <i>Sus scrofa</i>	900	1,300	125 (50–200)	0.65	1	6 (4–8)	Smith 和解 焱, 2009	6 (4–8)	8	Mitchell et al., 2009
毛冠鹿 <i>Elaphodus cephalophus</i>	600	1,700	21.5 (15–28)	0.51	1	1.5 (1–2)	Smith 和解 焱, 2009	1.5 (1–2)	–	–
小鹿 <i>Muntiacus reevesi</i>	1,300	1,700	13.5 (11–16)	0.41	1	1.5 (1–2)	冯祚建等, 1986	1.5 (1–2)	1	Smith 和解 焱, 2009
中华鬣羚 <i>Capricornis milneedwardsii</i>	1,400	1,800	112.5 (85–140)	0.32	1	1.5 (1–2)	周友兵等, 2005	1.5 (1–2)	–	–
中华斑羚 <i>Naemorhedus griseus</i>	1,400	1,800	27 (22–32)	0.40	1	1.5 (1–2)	Smith 和解 焱, 2009	1.5 (1–2)	0.33	Yin et al., 2024
林麝 <i>Moschus berezovskii</i>	1,400	1,800	7.5 (6–9)	0.32	1	1.5 (1–2)	Smith 和解 焱, 2009	1.5 (1–2)	1.16	刘嘉辉等, 2020

繁殖数 = 窝仔数 × 年产胎数
Fecundity = Litter size × Number of litter

附录 3 基于 Tweedie GLM 模型的道路距离分段对 6 种偶蹄类动物相对丰富度指数(RAI)的影响效应
Appendix 3 Effects of road distance segments on the relative abundance index (RAI) of six artiodactyl species based on Tweedie GLM models

物种 Species	道路影响域阈值 Road effect zone threshold (m)		回避区(0–近端影响域阈值) Avoidance zone (0–Near-road effect zone threshold)			过渡区(近端影响域阈值–远端影响域阈值) Transition zone (Near-road effect zone threshold–Far-road effect zone threshold)			稳定区(远端影响域阈值–3000) Stable zone (Far-road effect zone threshold–3000)		
	近端 Near	远端 Far	$\beta(10^{-3})$	T	P	$\beta(10^{-3})$	T	P	$\beta(10^{-3})$	T	P
野猪 <i>Sus scrofa</i>	900	1,300	0.023	0.066	0.947	2.858	4.096	< 0.001***	–0.395	–1.616	0.107
毛冠鹿 <i>Elaphodus cephalophus</i>	600	1,700	0.517	0.983	0.326	–1.594	–5.263	< 0.001***	0.692	1.345	0.179
小鹿 <i>Muntiacus reevesi</i>	1,300	1,700	0.432	1.885	0.060	1.645	2.303	0.021*	–1.520	–2.446	0.015*
中华鬣羚 <i>Capricornis milneedwardsii</i>	1,400	1,800	1.461	8.058	< 0.001***	–2.78	–3.886	< 0.001***	0.012	0.026	0.979
中华斑羚 <i>Naemorhedus griseus</i>	1,400	1,800	1.349	6.005	< 0.001***	–2.45	–2.753	0.006**	–0.299	–0.515	0.606
林麝 <i>Moschus berezovskii</i>	1,400	1,800	1.597	6.904	< 0.001***	–2.227	–2.753	0.011*	–0.086	–0.158	0.874

β , 每个区域对数尺度上的斜率; T , Wald 检验统计量; *** $P < 0.001$, ** $P < 0.01$, * $P < 0.05$.
 β , Slope on log scale; T , Wald statistic; *** $P < 0.001$, ** $P < 0.01$, * $P < 0.05$.

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