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Supplementary Material

Long-term effects of grating derelict mines on bat emergence activity, abundance and behaviour

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Supplementary material – S1

Brief descriptions are provided below for each spatial cluster of mines that were surveyed.

Alum Mountain

Alum Mountain is situated 1.5 km to the east of the township of Bulahdelah on the mid-north coast region of NSW. The mountain reaches an elevation of ~280 m above sea level (ASL) and comprises tall open forest. Key species include tallowwood (*Eucalyptus microcorys*), Sydney peppermint (*E. piperita*), blackbutt (*E. pilularis*) and smooth barked apples (*Angophora costata*), with grass trees (*Xanthorrhoea*) dominating the understorey towards the summit. The area was mined for alunite (hydrated aluminium potassium sulphate) from 1888 until 1952.

Baerami – Wollemi National Park

Baerami Creek valley is located approximately 80 km south-west of Muswellbrook in the northern section of Wollemi National Park, in the Hunter Valley region. The vegetation in the valley is montane dry sclerophyll forest with prominent species including Sydney peppermint (*E. piperita*), narrow-leaved peppermint (*E. radiata*), narrow-leaved ironbark (*E. crebra*) and acacias and allocasuarinas in the understorey, while the head of the valley is open farmland with grazing cattle. The valley was previously mined for oil shale from 1925 until the mid-1940s, with several mine adits present within the adjacent hillsides of the Baerami Creek valley at elevations between 250 – 500 m ASL.

Bathurst and surrounds

This cluster includes mines around Burruga, Napoleon Reef, Ophir, Sunny Corner and Trunkey Creek.

- Burraga is located ~67 km south of Bathurst at ~880 m ASL. The area was mined for copper from 1880 to 1920, and irregularly up to 1961. The area around the mine has been cleared but is adjacent to a large pine plantation (*Pinus radiata*).
- Napoleon Reef is situated 16 km east of Bathurst at an elevation of ~890 m ASL. Vegetation is largely open woodlands with a canopy composed of species such as narrow-leaved apple (*Angophora bakeri*), red bloodwood (*Corymbia gummifera*) and grey gum (*E. punctata*). Understorey and ground cover is sparse and agricultural pastures and farms surround the area (Engel Feb 2006). Gold was mined in the area from 1856 until 1911, but old diggings have been reworked over the years.
- Ophir gold fields are situated ~30 km north of Orange and ~75 km north-west of Bathurst at elevations between 660 – 720 m ASL. Vegetation is open woodland similar in composition to that of Napoleon Reef. The Ophir region was mined from 1851 until the late 1890s.
- Sunny Corner is located ~30 km east of Bathurst with mine sites around 1200 m ASL. Vegetation is open woodland dominated by broad-leaved peppermint (*Eucalyptus dives*), brown barrel (*E. fastigata*), silver wattle (*Acacia dealbata*) and blackwood (*A. melanoxylon*) (Engel Oct 2009). Sunny Corner was mined for gold from the early 1860s until the 1880s, when focus shifted toward mining silver, gold, zinc and antimony. Operations ceased in 1922.
- Trunkey Creek is situated ~24 km north-east of Burraga and ~60 km south-west from Bathurst. Mine entrances are between 850 – 950 m ASL and are located in open woodlands with predominant tree species including Blakely's red gum (*E. blakeyi*), broad-leaved peppermint (*E. dives*) and brittle gum (*E. mannifera*). Gold was mined in the region between 1851 and 1914.

Bimbimbie

The historic locality of Bimbimbie is situated approximately 11 km south-west of Bateman's Bay, in Mogo State Forest on the south coast of NSW. The forest is characterised by Southern Lowland Wet Sclerophyll forest with dominant species including spotted gum (*Corymbia maculata*), *E. pilularis*, woollybutt (*E. longifolia*) and bangalay (*E. botryoides*) and a shrubby understory dominated by cycads (chiefly *Macrozamia communis*). The area was previously mined for gold between 1912 and 1920, with several mine adits and shafts present today. One major adit (Kellys Mine) that is known to be used by bats is located adjacent to Kellys Creek and connected to several shafts that are situated on the top of a ridge at ~180 m elevation.

Bingara and Barraba

The Upper Bingara Three Creeks Gold mine is situated ~24 km south of the township of Bingara, in northern NSW. The mine adits and shafts are located along the creek line and higher up the ridges of Barrack Creek between 600 and 650 m ASL. Gold Mining operations began in the 1850s and continued until the mid-1880s. Vegetation is characteristic of Northern Tableland dry sclerophyll forest with key species including black cypress pine (*Callitris endlicheri*), gum-topped peppermint (*Eucalyptus andrewsii*) and tumbledown red gum (*E. dealbata*). The mine adits 9 km north of Barraba on the other hand, were situated in open farmland with remnants of New England Grassy Woodland, including a few scattered rough-barked apples (*A. floribunda*), Blakey's red gums (*E. blakelyi*) and stringybarks. This site was ~550 m ASL and has been mined for diatomite since the 1950s.

Copeland Tops State Conservation Area

Copeland Tops State Conservation Area (SCA) covers an area of 2420 hectares and is situated ~18 km west of Gloucester in the mid-north coast region of NSW. The SCA comprises a mixture of vegetation types including both subtropical and dry lowland rainforest, as well as open eucalypt forest. The dry rainforest communities are dominated by shatterwood (*Backhousia sciadophora*) and grey myrtle (*B. myrtifolia*), while Moreton Bay figs (*Ficus macrophylla macrophylla*) and giant stinging trees (*Dendrocnide excelsa*) are indicative of subtropical rainforest. Craven grey box (*Eucalyptus largeana*) and grey gum (*E. biturbinata*) characterise the open forest, however other dry sclerophyll species such as white mahogany (*E. acmenoides*), forest red gum (*E. tereticornis*) and rough barked apple (*Angophora floribunda*) are also common. The topography of the SCA encompasses relatively high mountain ridges with elevation ranging from 300 to 825 m ASL, but also valleys at lower elevations. Parts of the SCA were mined for gold from 1876 until the 1930's, with several adits and shafts located at these lower elevations along Copeland Creek.

Grassy Gully

Grassy gully is located ~20 km west of Nowra on the south coast of NSW at about 150 m ASL. The vegetation is Coastal Valley Grassy Woodland dominated by species such as rough-barked apple (*Angophora floribunda*) and forest red gums (*E. tereticornis*). Blackthorn (*Bursaria spinulosa*) and acacias are common in the understorey. Gold was mined in the area between the early 1860s until the late 1960s.

Hill End

Hill End Historic gold mining village is situated 75 km north-west of Bathurst and is ~880 m ASL. The region is littered with abandoned mine shafts and adits, all within close proximity of the township. The vegetation of the area is largely woodland with long-leaf box (*E. goniocalyx*) and

red gums (*E. blakelyi*), interspersed with open grasslands with scattered pines. The initial Hill End gold rush occurred during the 1850s, with a resurgence of mining activity during the 1860s and 70s. From 1994, Hill End Gold Limited recommenced mining operations in the nearby Red Hill, Hawkins Hill and Reward areas.

Other

This cluster covers a small number of isolated sites which were surveyed during autumn. Southern Coal North and South adits are located on the flanks of Mt Kembla on the Illawarra escarpment near Wollongong, NSW at ~300 m ASL. These adits were used to mine coal between 1888 and 1890. Vegetation in the area is largely subtropical rainforest with species including Moreton Bay figs (*Ficus macrophylla macrophylla*), giant stinging trees (*Dendrocnide excelsa*) and Illawarra flame trees (*Brachychiton acerifolius*). Brown's Colliery is located in Blue Gum Hills Regional Park in Minmi, Hunter Valley region, NSW. The mine was an active coal colliery between 1884 and 1900. Vegetation is dry sclerophyll with species including blue gum (*E. saligna*), white mahogany (*E. acmenoides*), white stringybark (*E. globoidea*), grey ironbark (*E. paniculata*) and sweet pittosporum (*Pittosporum undulatum*). Elevation is 35 m ASL.

Table S1. Grate and gap dimensions, as well as time since installation (where applicable) for all surveyed mines in autumn and winter 2017.

Site	Mine	Feature	Treatment	Time since installation (years)	Grate dimensions (cm)	Gap Dimensions (distance between bars - cm)	
						Horizontal Beams	Vertical Beams
Alum Mountain	Alum Mountain Mine	Adit	Bat friendly grate	16	210 × 160	22	34
	Alum Mountain Cave	Adit	Ungrated	NA	NA	NA	NA
Barraba	ML1195a	Adit	Ungrated	NA	NA	NA	NA
	ML1195c	Adit	Ungrated	NA	NA	NA	NA
Bimbimbie	Bimbimbie 1	Adit	'Bat friendly' grate	3	145 × 150	19	145
	Bimbimbie 2	Shaft	'Bat friendly' grate	3	185 × 75	13	NA
	Bimbimbie 3	Shaft	'Bat friendly' grate	3	60 × 40	13	NA
	Bimbimbie 4	Shaft	'Bat friendly' grate	3	55 × 20	13	NA
	Bimbimbie 5	Shaft	'Bat friendly' grate	3	25 × 20	13	NA
	Bimbimbie 6	Shaft	'Bat friendly' grate	3	30 × 20	13	NA

Site	Mine	Feature	Treatment	Time since installation (years)	Grate dimensions (cm)	Gap Dimensions (distance between bars - cm)	
						Horizontal Beams	Vertical Beams
Bingara	Bingara 6	Adit	Ungrated	NA	NA	NA	NA
	Bingara 7	Shaft	'Bat friendly' grate	9	300 × 300 × 90	21	290
	Bingara 8	Shaft	Standard grate	9	300 × 300 × 23	10	NA
Burraga	Burraga 1	Shaft	Ungrated (fenced)	NA	NA	NA	NA
	Burraga 2	Shaft	Ungrated	NA	NA	NA	NA
	Burraga 3	Shaft	Chimney grate	11	375 × 220 × 15	NA	NA
	Burraga 4	Shaft	Chimney grate	11	470 × 420 × 15	NA	NA
Copeland Tops	Adit 1	Adit	Ungrated	NA	NA	NA	NA
SCA	Adit 4	Adit	Standard grate	2	130 × 27	NA	10
	Adit 5	Adit	Standard grate	2	130 × 160	NA	10
	Adit A	Adit	Standard grate	2	130 × 180	NA	10

Site	Mine	Feature	Treatment	Time since installation (years)	Grate dimensions (cm)	Gap Dimensions (distance between bars - cm)	
						Horizontal Beams	Vertical Beams
	Adit X	Adit	Ungrated	NA	NA	NA	NA
	Hidden Treasure	Adit	Standard grate	2	120 × 165	NA	15
	Lady Lizzie	Adit	Standard grate	9	170 × 110	NA	10
	Mountain Maid	Adit	'Bat friendly' grate	9	160 × 175	26	23
	Shaft 1	Shaft	Ungrated	NA	NA	NA	NA
	Shaft 2	Shaft	Ungrated	NA	NA	NA	NA
	Shaft 3	Shaft	Ungrated	NA	NA	NA	NA
	Shaft 4	Shaft	Ungrated	NA	NA	NA	NA
	Shaft 5	Shaft	Standard grate	2	335 × 330	NA	NA
	Shaft 6	Shaft	Standard grate	2	250 × 230 × 10	NA	NA
Hill End	Bald 4	Shaft	'Bat friendly' grate	10	400 × 400 × 54	20	185

Site	Mine	Feature	Treatment	Time since installation (years)	Grate dimensions (cm)	Gap Dimensions (distance between bars - cm)	
						Horizontal Beams	Vertical Beams
	Bald 6	Shaft	'Bat friendly' grate	10	300 × 281 × 48	18	130
	Bald 10	Shaft	'Bat friendly' grate	10	252 × 240 × 32	15	234
	Bald 12	Shaft	'Bat friendly' grate	10	263 × 240 × 46	20	118
	Bald 14	Shaft	'Bat friendly' grate	10	322 × 282 × 46	16	145
	German 37	Shaft	'Bat friendly' grate	8	300 × 240 × 62	16	75
	German 39	Shaft	'Bat friendly' grate	8	281 × 241 × 63	16	65
	German 41	Shaft	'Bat friendly' grate	8	240 × 200 × 66	16	40
	German 43	Shaft	'Bat friendly' grate	8	-	-	-
	German 60	Shaft	'Bat friendly' grate	8	400 × 300 × 60	12	80
	German new	Shaft	'Bat friendly' grate	8	450 × 300 × 60	17	70
	Golden 9	Shaft	'Bat friendly' grate	2	290 × 260 × 60	13	45

Site	Mine	Feature	Treatment	Time since installation (years)	Grate dimensions (cm)	Gap Dimensions (distance between bars - cm)	
						Horizontal Beams	Vertical Beams
	Irish 18	Shaft	'Bat friendly' grate	10	270 × 240 × 45	18	118
	Irish 20	Shaft	'Bat friendly' grate	10	540 × 350 × 54	18	160
	Irish 22	Shaft	'Bat friendly' grate	10	450 × 362 × 53	15	185
	Irish 26	Shaft	'Bat friendly' grate	10	383 × 361 × 54	18	170
	Irish 28	Shaft	'Bat friendly' grate	10	300 × 280 × 45	20	135
	Irish 30	Shaft	'Bat friendly' grate	10	320 × 280 × 45	19	140
	Irish 40	Shaft	'Bat friendly' grate	10	300 × 250 × 42	16	270
	Irish fenced	Shaft	Ungrated (fenced)	NA	NA	NA	NA
	Irish fenced 2	Shaft	Ungrated (fenced)	NA	NA	NA	NA
	Valentine 5	Shaft	'Bat friendly' grate	2	290 × 270 × 62	13	NA
	Valentine 6	Shaft	'Bat friendly' grate	2	290 × 270 × 60	13	NA

Site	Mine	Feature	Treatment	Time since installation (years)	Grate dimensions (cm)	Gap Dimensions (distance between bars - cm)	
						Horizontal Beams	Vertical Beams
	Valentine 7	Shaft	Ungrated (fenced)	NA	NA	NA	NA
	Valentine 8 & 9	Shaft	'Bat friendly' grate	2	NA	NA	NA
	Valentine ungrated	Shaft	Ungrated	NA	NA	NA	NA
Illawarra	Sthn Coal Nth	Adit	Standard grate	5	440 × 120	NA	15
Escarpment	Sthn Coal Sth	Adit	'Bat friendly' grate	5	320 × 340	13	12
Minmi	Brown's Colliery	Shaft	'Bat friendly' grate	2	400 × 400 × 76	10	43
Morton SCA	PWD 03	Adit	Standard grate	8	160 × 155	NA	14
(Grassy Gully)	PWD 05	Adit	Standard grate	8	195 × 66	NA	5
	PWD 06	Shaft	Ungrated (fenced)	NA	NA	NA	NA
	PWD A	Shaft	Ungrated (fenced)	NA	NA	NA	NA
Napolean Reef	Napolean Reef 3	Shaft	Ungrated (fenced)	NA	NA	NA	NA

Site	Mine	Feature	Treatment	Time since installation (years)	Grate dimensions (cm)	Gap Dimensions (distance between bars - cm)	
						Horizontal Beams	Vertical Beams
	Napolean Reef 4	Shaft	'Bat friendly' grate	8	405 × 405	13	NA
	Napolean Reef 5	Shaft	Ungrated (fenced)	NA	NA	NA	NA
	Napolean Reef 8	Shaft	'Bat friendly' grate	8	405 × 405	12	NA
Ophir Goldfields	Ophir 6	Shaft	'Bat friendly' grate	8	375 × 240	13	NA
	Ophir 7	Shaft	'Bat friendly' grate	8	375 × 240	15	NA
Sunny Corner	Sunny 5	Adit	Ungrated	NA	NA	NA	NA
Trunkey Creek	Trunkey 2	Shaft	Chimney grate	10	270 × 180	NA	NA
	Trunkey 6	Shaft	Chimney grate	10	370 × 320	NA	NA
	Trunkey 7	Shaft	Chimney grate	10	320 × 320	NA	NA
Wollemi NP	Evening Star	Adit	'Bat friendly' grate	16	85 × 90	17	NA
(Baerami)	Evening Star 2	Adit	'Bat friendly' grate	16	200 × 30	17	NA

Site	Mine	Feature	Treatment	Time since installation (years)	Grate dimensions (cm)	Gap Dimensions (distance between bars - cm)	
						Horizontal Beams	Vertical Beams
	Glasgow	Adit	Ungrated	NA	NA	NA	NA
	Grated A	Shaft	Standard grate	10	300 × 300	NA	NA
	Neates 1	Adit	'Bat friendly' grate	20	315 × 150	18	105
	Neates 2	Adit	'Bat friendly' grate	19	180 × 75	17	NA
	Neates 3	Adit	'Bat friendly' grate	16	450 × 290	17	140
	Randall	Adit	Ungrated	NA	NA	NA	NA
	Simon	Adit	Ungrated	NA	NA	NA	NA
	Widden	Adit	'Bat friendly' grate	16	110 × 130	24	65
	Widden 2	Adit	'Bat friendly' grate	16	110 × 130	24	65

Table S2. Summary of grate condition, colony size estimates and emergence activity (no. of calls in first hr after dusk) at all surveyed sites.

Site	Mine	Treatment	Feature	Grate Condition (% rust)	Vegetation Cover (%)	Population Estimate		Number of Calls	
						Autumn	Winter	Autumn	Winter
Alum Mountain	Alum Mountain Mine	'Bat friendly' grate	Adit	95	25	74	1491	438	331
	Alum Mountain Cave	Ungrated	Adit	NA	0	-	1	13	35
Barraba	ML1195a	Ungrated	Adit	NA	0	-	-	41	-
	ML1195c	Ungrated	Adit	NA	0	-	-	118	-
Bimbimbie	Bimbimbie 1	'Bat friendly' grate	Adit	95	0	532	1361	1110	1483
	Bimbimbie 2	'Bat friendly' grate	Shaft	0	0	-	54	-	1142
	Bimbimbie 3	'Bat friendly' grate	Shaft	0	0	-	-	-	297
	Bimbimbie 4	'Bat friendly' grate	Shaft	0	0	-	-	-	65
	Bimbimbie 5	'Bat friendly' grate	Shaft	0	20	-	-	-	21
	Bimbimbie 6	'Bat friendly' grate	Shaft	0	0	-	-	-	108
Bingara	Bingara 6	Ungrated	Adit	NA	0	-	-	269	-
	Bingara 7	'Bat friendly' grate	Shaft	5	10	0	-	20	-
	Bingara 8	Standard grate	Shaft	0	0	0	-	0	-
Burraga	Burraga 1	Ungrated (fenced)	Shaft	NA	0	-	-	21	-

Site	Mine	Treatment	Feature	Grate Condition (% rust)	Vegetation Cover (%)	Population Estimate		Number of Calls	
						Autumn	Winter	Autumn	Winter
	Burraga 2	Ungrated	Shaft	NA	0	292	-	136	-
	Burraga 3	Chimney grate	Shaft	15	0	0	-	1	-
	Burraga 4	Chimney grate	Shaft	15	0	0	-	2	-
Copeland Tops SCA	Adit 1	Ungrated	Adit	NA	20	-	3	2	13
	Adit 4	Standard grate	Adit	0	0	-	0	8	10
	Adit 5	Standard grate	Adit	0	0	0	-	0	6
	Adit A	Standard grate	Adit	5	0	-	3	11	13
	Adit X	Ungrated	Adit	NA	0	-	-	40	8
	Hidden Treasure	Standard grate	Adit	0	0	122	162	174	1339
	Lady Lizzie	Standard grate	Adit	5	0	3	1	75	25
	Mountain Maid	'Bat friendly' grate	Adit	95	0	376	367	247	1956
	Shaft 1	Ungrated	Shaft	NA	20	-	-	12	0
	Shaft 2	Ungrated	Shaft	NA	15	-	-	1	2
	Shaft 3	Ungrated	Shaft	NA	0	-	-	0	0
	Shaft 4	Ungrated	Shaft	NA	5	-	-	9	1

Site	Mine	Treatment	Feature	Grate Condition (% rust)	Vegetation Cover (%)	Population Estimate		Number of Calls	
						Autumn	Winter	Autumn	Winter
	Shaft 5	Standard grate	Shaft	15	10	-	-	5	2
	Shaft 6	Standard grate	Shaft	0	40	-	-	1	0
Hill End	Bald 4	'Bat friendly' grate	Shaft	10	10	-	-	1	-
	Bald 6	'Bat friendly' grate	Shaft	5	20	-	-	2	-
	Bald 10	'Bat friendly' grate	Shaft	90	60	0	-	9	-
	Bald 12	'Bat friendly' grate	Shaft	5	90	-	-	4	-
	Bald 14	'Bat friendly' grate	Shaft	5	60	-	-	1	-
	German 37	'Bat friendly' grate	Shaft	0	65	0	-	39	-
	German 39	'Bat friendly' grate	Shaft	0	50	-	-	28	-
	German 41	'Bat friendly' grate	Shaft	0	10	-	-	0	-
	German 43	'Bat friendly' grate	Shaft	0	20	0	-	-	-
	German 60	'Bat friendly' grate	Shaft	0	20	-	-	6	-
	German new	'Bat friendly' grate	Shaft	0	5	-	-	0	-
	Golden 9	'Bat friendly' grate	Shaft	0	0	-	-	0	-
	Irish 18	'Bat friendly' grate	Shaft	10	5	-	-	6	-

Site	Mine	Treatment	Feature	Grate Condition (% rust)	Vegetation Cover (%)	Population Estimate		Number of Calls	
						Autumn	Winter	Autumn	Winter
	Irish 20	'Bat friendly' grate	Shaft	5	95	-	-	0	-
	Irish 22	'Bat friendly' grate	Shaft	0	30	-	-	1	-
	Irish 26	'Bat friendly' grate	Shaft	0	70	-	-	5	-
	Irish 28	'Bat friendly' grate	Shaft	0	70	-	-	0	-
	Irish 30	'Bat friendly' grate	Shaft	0	45	-	-	1	-
	Irish 40	'Bat friendly' grate	Shaft	30	65	0	-	0	-
	Irish fenced	Ungrated (fenced)	Shaft	NA	30	-	-	2	-
	Irish fenced 2	Ungrated (fenced)	Shaft	NA	40	-	-	1	-
	Valentine 5	'Bat friendly' grate	Shaft	0	0	-	-	0	-
	Valentine 6	'Bat friendly' grate	Shaft	0	0	0	-	6	-
	Valentine 7	Ungrated (fenced)	Shaft	0	0	-	-	1	-
	Valentine 8 & 9	'Bat friendly' grate	Shaft	0	0	-	-	11	-
	Valentine ungrated	Ungrated	Shaft	NA	0	0	-	5	-
Illawarra	Sthn Coal Nth	Standard grate	Adit	0	15	-	-	2	-
Escarpment	Sthn Coal Sth	'Bat friendly' grate	Adit	0	85	-	-	13	-

Site	Mine	Treatment	Feature	Grate Condition (% rust)	Vegetation Cover (%)	Population Estimate		Number of Calls	
						Autumn	Winter	Autumn	Winter
Minmi	Brown's Colliery	'Bat friendly' grate	Shaft	5	20	-	-	4	-
Morton SCA (Grassy Gully)	PWD 03	Standard grate	Adit	5	0	-	-	7	-
	PWD 05	Standard grate	Adit	5	NA	-	-	73	-
	PWD 06	Ungrated (fenced)	Shaft	NA	5	-	-	2	-
	PWDA	Ungrated (fenced)	Shaft	NA	20	-	-	4	-
Napolean Reef	Napolean Reef 3	Ungrated (fenced)	Shaft	NA	0	-	-	1	-
	Napolean Reef 4	'Bat friendly' grate	Shaft	5	5	-	-	0	-
	Napolean Reef 5	Ungrated (fenced)	Shaft	NA	0	-	-	14	-
	Napolean Reef 8	'Bat friendly' grate	Shaft	10	10	-	-	46	-
Ophir Goldfields	Ophir 6	'Bat friendly' grate	Shaft	0	35	-	-	0	-
	Ophir 7	'Bat friendly' grate	Shaft	0	5	0	-	2	-
Sunny Comer	Sunny 5	Ungrated	Adit	NA	0	-	-	615	-
Trunkey Creek	Trunkey 2	Chimney grate	Shaft	0	0	-	-	9	-
	Trunkey 6	Chimney grate	Shaft	0	0	-	-	3	-
	Trunkey 7	Chimney grate	Shaft	5	0	-	-	9	-

Site	Mine	Treatment	Feature	Grate Condition (% rust)	Vegetation Cover (%)	Population Estimate		Number of Calls	
						Autumn	Winter	Autumn	Winter
Wollemi NP (Baerami)	Evening Star	'Bat friendly' grate	Adit	70	0	-	80	321	1026
	Evening Star 2	'Bat friendly' grate	Adit	5	10	-	6	-	114
	Glasgow	Ungrated	Adit	NA	0	-	-	-	49
	Grated A	Standard grate	Shaft	10	70	-	-	4	1
	Neates 1	'Bat friendly' grate	Adit	80	5	234	56	973	398
	Neates 2	'Bat friendly' grate	Adit	75	5	-	67	183	845
	Neates 3	'Bat friendly' grate	Adit	70	10	333	704	1258	1535
	Randall	Ungrated	Adit	NA	0	-	-	8	158
	Simon	Ungrated	Adit	NA	5	-	-	3	24
	Widden	'Bat friendly' grate	Adit	75	0	-	-	101	10
Widden 2	'Bat friendly' grate	Adit	30	0	-	-	-	50	

Table S3. Summary of wing morphology, flight behaviour and use of torpor in winter for subterranean-roosting species in the study area.

Species	Wing loading	Aspect ratio	Flight behaviour	Use of torpor/hibernation	References
<i>Chalinolobus dwyeri</i>	Low	Low	Very high manoeuvrability, high agility	Torpor	Churchill (2008); Williams & Thomson (2019)
<i>Miniopterus australis</i>	Low	Moderate	Medium–high manoeuvrability, medium–high agility	Torpor	Dwyer (1967); Rhodes (2002)
<i>Miniopterus orianae oceanensis</i>	Moderate	Moderate	Medium manoeuvrability, low agility	Multi-day torpor bouts	Geiser (2006), Rhodes (2002)
<i>Rhinolophus megaphyllus</i>	Low	Low	Slow, but highly manoeuvrable flight	Short bouts of torpor during adverse weather conditions	Rhodes (2002)
<i>Vespadelus troughtoni</i>	Low	Low	Medium–high manoeuvrability, medium–high agility		Law et al. (2005)

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