

# Establishing baseline bat activity, diversity, and resource use in Tanglewood, Conservation Area, South Africa

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## Introduction

- Habitat loss, fragmentation, and degradation reduce landscape connectivity and are major drivers of global biodiversity loss (Ceballos et al. 2015)
- For example, the conversion of land in South Africa to agriculture in the 1700s severely fragmented habitats (Russell and Ward 2015)

- To restore biodiversity, the South Africa National Parks agency (SANParks) is proposing multiple large-scale mosaic corridors to reconnect protected areas across the entire country's landscape (Lichtenberg 2025)
- Tanglewood Conservation Area (TCA) represents the first property secured within the proposed Albany Biosphere corridor in the Eastern Cape and is slated to undergo restoration (Fig. 1)



- To evaluate the effectiveness of the restoration strategies implemented, baseline monitoring is required to establish a change over time (Merenlender et al. 2022)
- As bats respond rapidly to any improvements to habitat quality, they can be used as indicators of ecosystem health (Ismail et al. 2023)
- We therefore conducted bat behavioral observation surveys across TCA (Fig. 2) to collect baseline activity, diversity, and resource use in the area prior to its restoration

## Methods

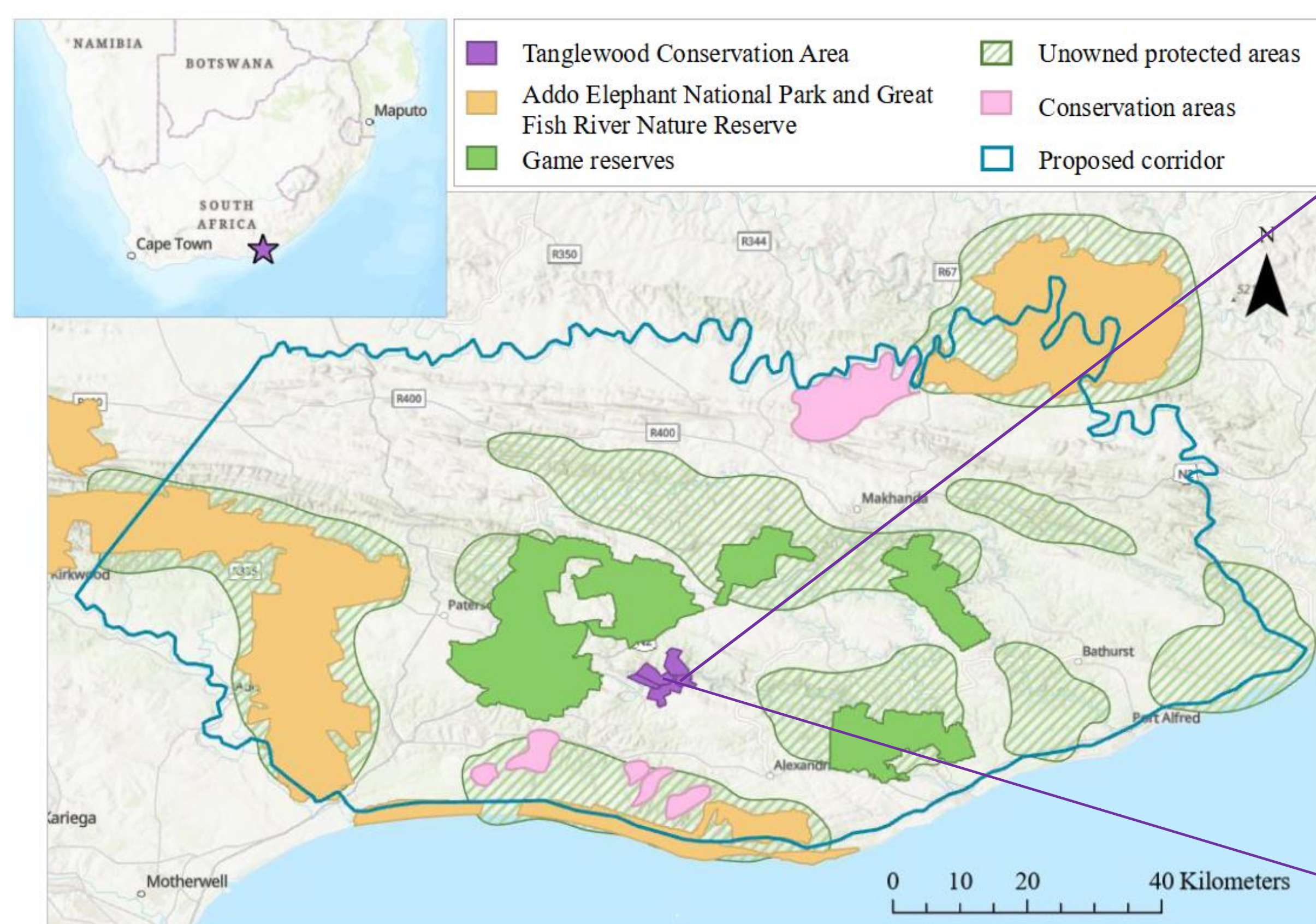


Figure 1: The proposed Albany Biosphere corridor linking Addo Elephant National Park to Great Fish River Nature Reserve

## Study Sites



Figure 2: Three resource survey sites in Leopard Ridge on TCA, South Africa, including two water resources (Causeway and Lodge) and one roost resource (Bat Cave)

## Behavioral Observational Surveys

Location	IR View
Lodge	
Causeway	
Cave	

Table 1: Infrared camera field-of view of each study site

- Survey timing:** May to July, 2025. Began 20 min after sunset
- Surveys continued for ~2.5 hrs during the primary period for bat activity at water sources, and for one hour at the cave to capture the majority of bats emerging for the night
- To record bat activity, we used a night vision Canon AX20 HD camcorder with ATN Super Long Range Infrared Illuminator IR450 lights (Table 1)
- We used AudioMoth ultrasonic detectors to identify bats to species (Fig. 3)
- At cave site specifically, the number of bats emerging from the roost was counted by two technicians each with a clicker counter

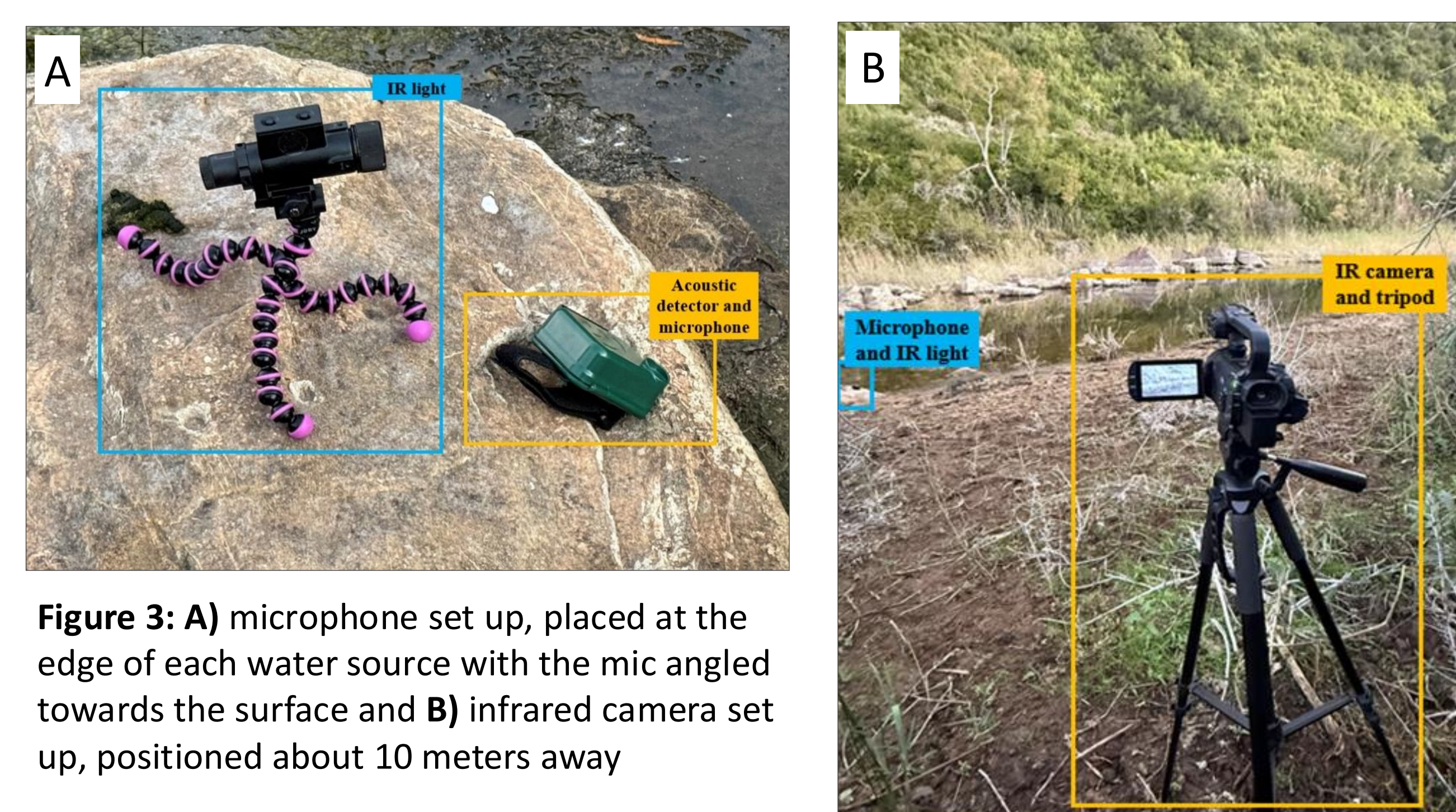


Figure 3: A) microphone set up, placed at the edge of each water source with the mic angled towards the surface and B) infrared camera set up, positioned about 10 meters away

## Data Processing and Analysis

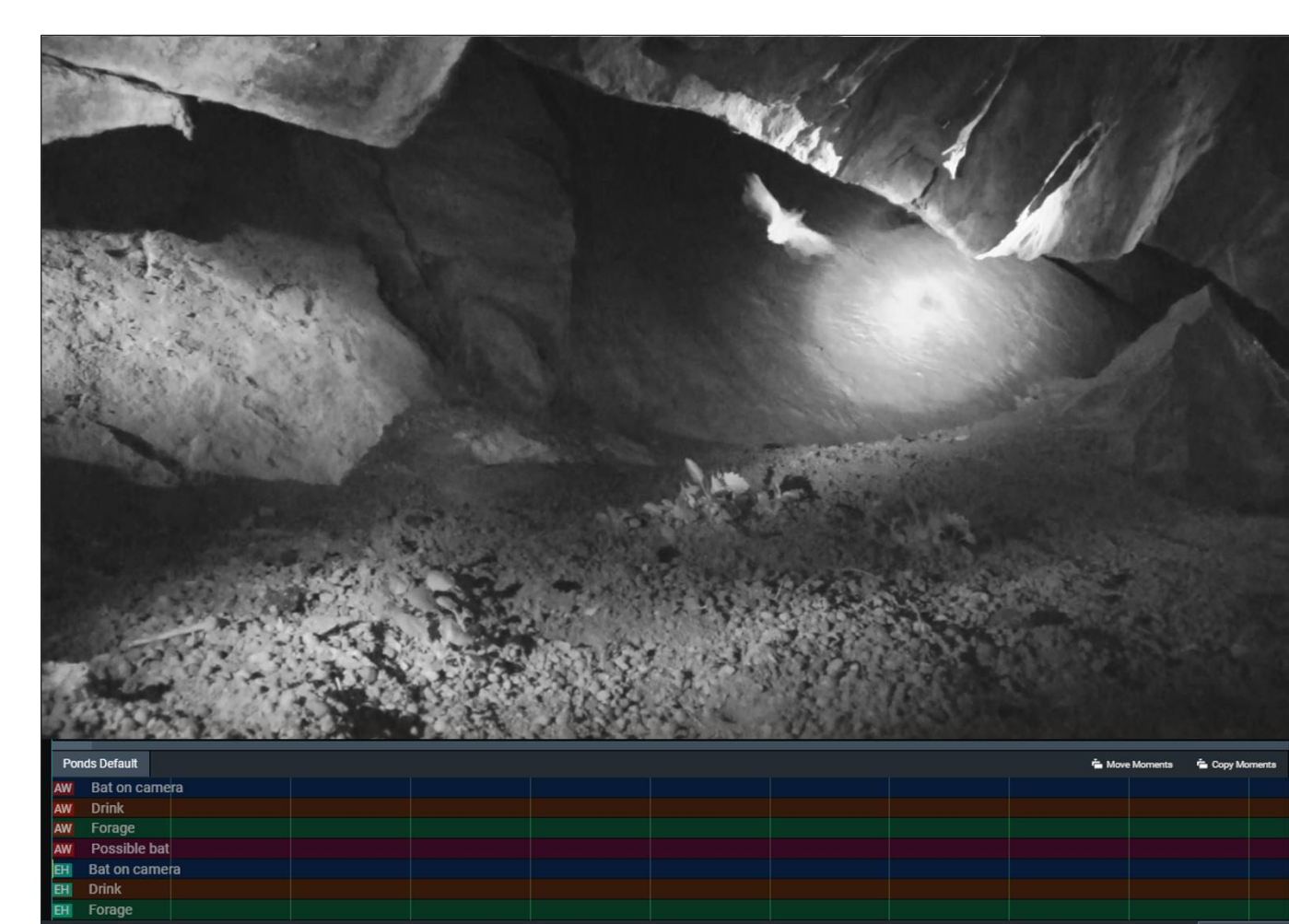


Figure 4: Example of 10 min track of infrared footage at the cave in Vosaic software with marked up timeline

- All footage processed using Vosaic software (v 1.1.3686; Fig. 4)
- SonoBat bat call analysis software (version 3.03) was used to identify species from acoustic calls recorded
- At the water sites, we identified the 1) total time bats were observed in the field of view, 2) total foraging time, and 3) number of drinking events observed
- At the cave, we recorded the total number of bats emerging per night

## Results

- We conducted **16** behavioral surveys at Causeway, **14** at the Lodge, and **13** emergent surveys at the Cave between 29 May and 20 July 2025
- Bats utilized each resource on **all survey nights**
- For the 30 total surveys at the water sources, bats were on camera for a total of **2,346 seconds**, averaging 76 seconds (ranging from 0-342 sec) a night (Fig. 5)
- We observed bats foraging for a total of **44 seconds** across surveys, with an average of 1 sec (ranging from 0-11 sec) a night (Fig. 5)
- A total of **91** drinking events were recorded, representing **five** species (Table 2)
- At the cave, an average of **720 bats** emerged a night (Fig. 6)
- Two species were recorded emerging from the cave: Cape horseshoe (*Rhinolophus capensis*) and Egyptian slit-faced (*Nycteris thebaica*; Fig. 7)

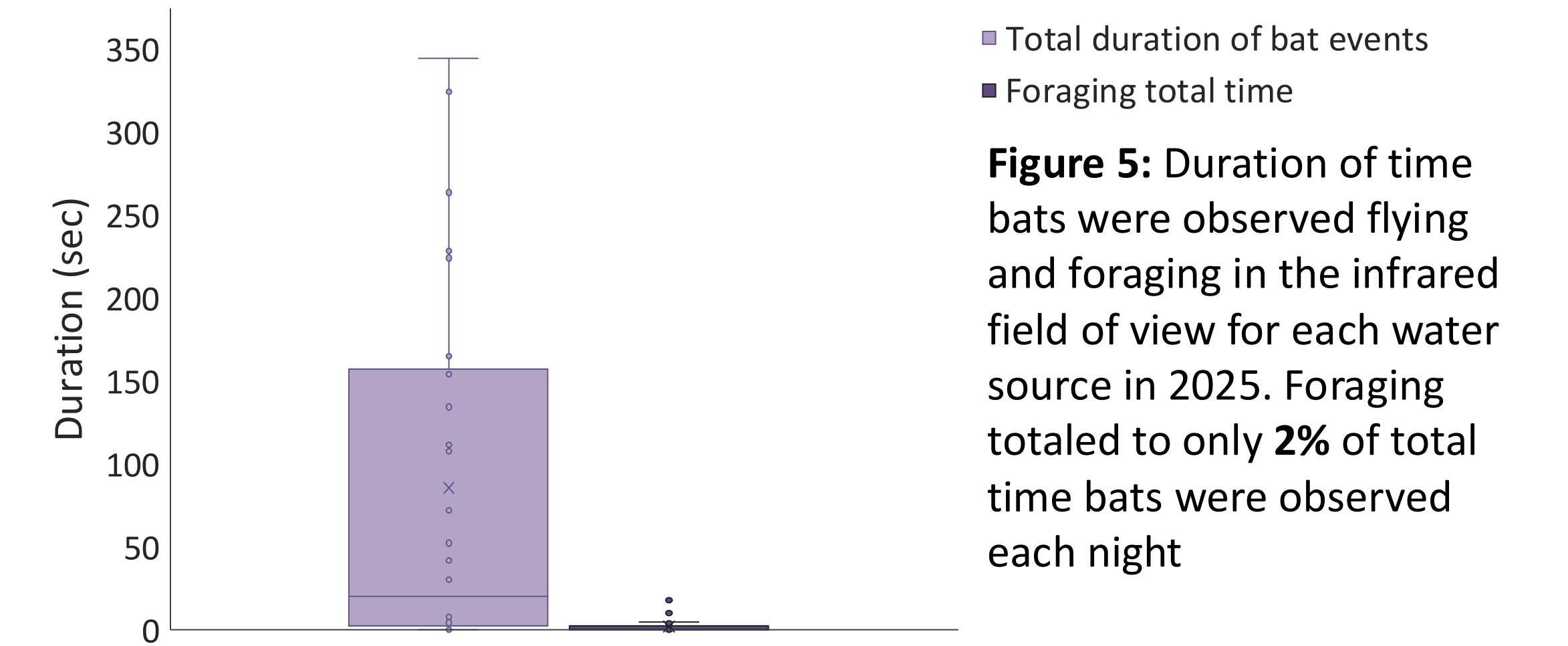


Figure 5: Duration of time bats were observed flying and foraging in the infrared field of view for each water source in 2025. Foraging totaled to only 2% of total time bats were observed each night

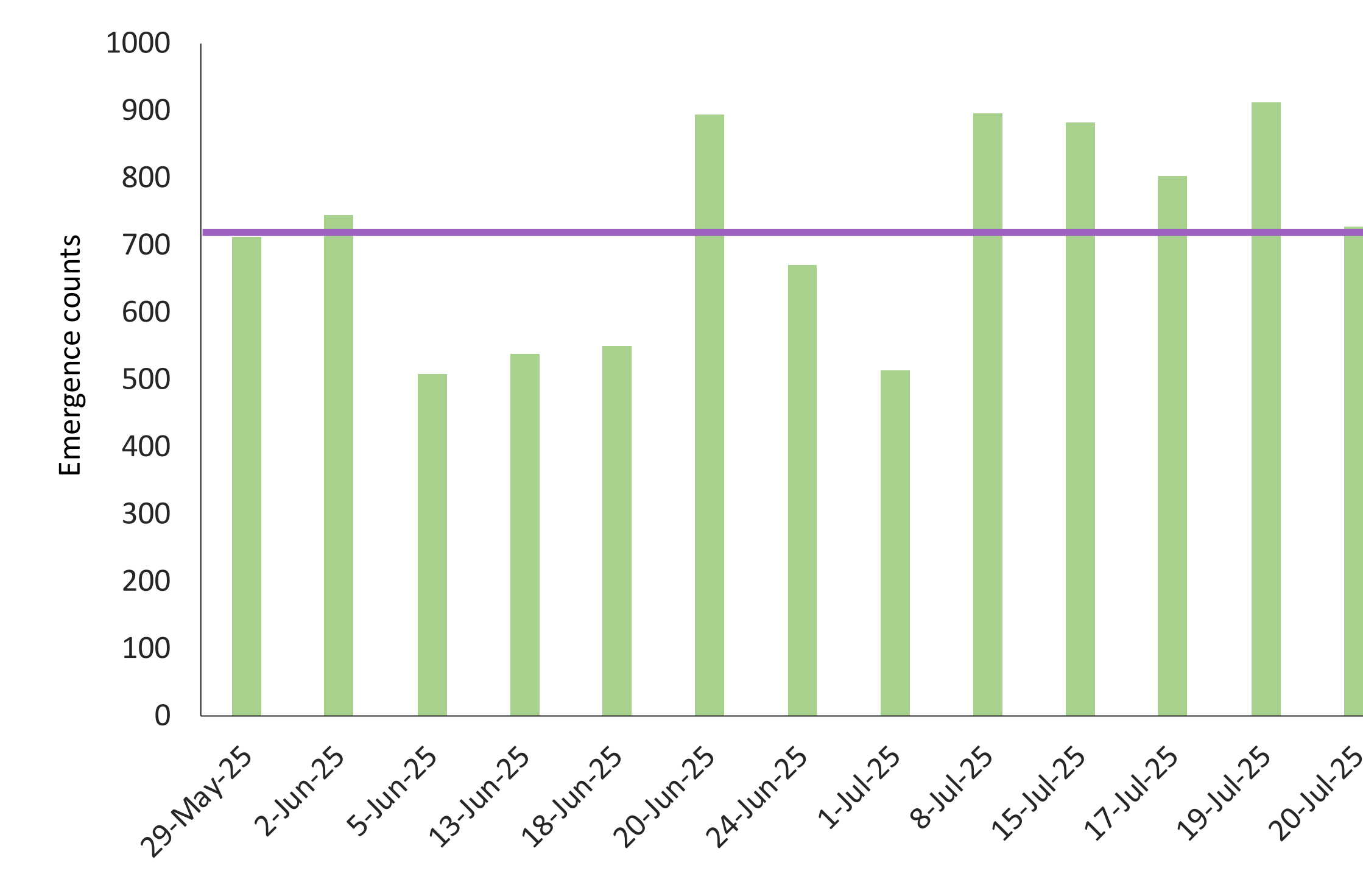


Figure 6: Total number (green) and average number (purple) of emergence events recorded at the cave roost site per night

Species	Picture	Number of drinks
Temminck's myotis ( <i>Myotis tricolor</i> )		41
Cape serotine ( <i>Laephotis capensis</i> )		28
Dusky pipistrelle ( <i>Pipistrellus hesperidus</i> )		19
Large-eared free-tailed ( <i>Otomops martiensseni</i> )		2
Yellow-bellied house ( <i>Scotophilus dinganii</i> )		1

Table 2: Number of times bats were observed drinking in the infrared field of view for each water source in 2025

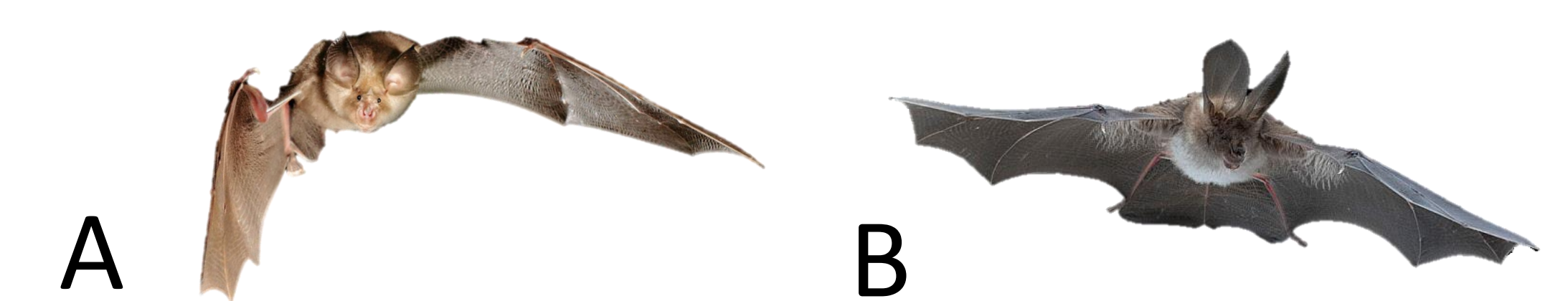


Figure 7: The two bat species utilizing the cave roost. A) Cape horseshoe and B) Egyptian slit-faced. Species A was recorded emerging earlier in the night

## Conclusions

- Bats were active at all resource sites with greater use at the Causeway than the Lodge, revealing a priority location for future monitoring
- Foraging comprised only a small proportion of observed activity per night, suggesting **limited prey availability** or reduced winter resource use
- Only common species were detected (McGee et al. 2023), indicating **low diversity under pre-restoration conditions**
- At the cave, both occupying species were consistent with winter roost use. However, seasonal patterns may differ
- These results provide **baseline estimates** of activity, diversity, and resource use
- As restoration progresses, increases in activity, diversity, and the presence less common species are expected
- Future work should incorporate expanded acoustic coverage across restoration areas year-round as well as radio telemetry to quantify movement and property use

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