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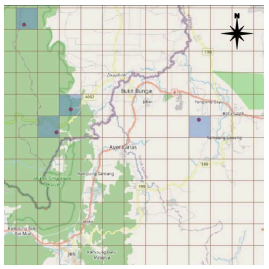
Protocols for Locality Data Collection, Area of Occupancy, and Extent of Occurence for IUCN Red List Assessment



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Nazifah Fitriyah Zariman[1], Juliana Senawi[1,2]

[1]Department of Biological Sciences and Biotechnology, Faculty of Science and Technology, National University of Malaysia;
[2]Langkawi Research Centre, Tuanku Abdul Halim Mu'adzam Shah Campus, Universiti Kebangsaan Malaysia, Teluk Yu Road, Burau Bay, 07100, Langkawi, Malaysia

Nazifah Fitriyah Zariman
National University of Malaysia

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We use this protocol and it's working

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Keywords: IUCN Red List Assessments, Chiroptera, Field work, Mapping, iucn red list assessment locality data, taxon through iucn red list criteria, iucn red list criteria, bat species, species identification, iucn eoo calculator toolbox, species, locality data collection, peninsular malaysia, number of location, taxon, area of occupancy, protocols for locality data collection, occupancy, satellite imagery

Abstract

Locality data for bat species in Peninsular Malaysia were obtained through literature review, field surveys, and museum records. Fieldwork involved harp traps, mist nets, and high nets, with biological measurements and species identification based on Kingston et al. (2006). Coordinates were standardized and mapped using QGIS 3.34.1. Area of Occupancy (AOO) and Extent of Occurrence (EOO) were calculated using GIS tools, including the IUCN EOO Calculator Toolbox in Arcmap 10.8.1. The number of locations was assessed using satellite imagery based on the most probable threat. This protocol is used for assessing the taxon through IUCN Red List criteria.

Guidelines

Harp traps were set up along forest trails, while mist nets and high nets were placed in open areas such as over rivers, within forest gaps, and in clearings at the study sites. All traps and nets were deployed from 7:00 PM to 7:00 AM, with a 20-metre distance maintained between harp traps. As the research involved wildlife, fieldwork protocols were strictly followed, including the use of face masks and gloves at all times.

Materials

Fieldwork and bat trapping were conducted using harp traps, mist nets, high nets, and GPS devices to record geographic coordinates. The Area of Occupancy (AOO) map was generated using QGIS, while the Extent of Occurrence (EOO) map was produced with ArcGIS incorporating the IUCN EOO Toolbox.

Safety warnings

Researchers were required to avoid disturbing natural habitats and to wear appropriate personal protective equipment (PPE) at all times during fieldwork. Rabies vaccination was also mandatory prior to engaging in any bat-handling activities.

Safety information

Rabies vaccination was also mandatory prior to engaging in any bat-handling activities.

Ethics statement

The protocol approval was received from the Institutional Animal Care and Use Committee at Texas Tech University (IACUC 10014-04; IACUC 18011-03). Permit to conduct research in Malaysia is received from Department of Wildlife and National Parks Peninsular Malaysia, the Forestry Department of Peninsular Malaysia, Sabah Biodiversity Centre, Sarawak Forestry Corporation, and the Malaysia Access to Biological Resources and Benefit Sharing (MyABS) under the code: (JPHL&TN (IP): 100-34/1.24 Jld 14(31); JPHL&TN (IP): 600-6/1/4 24 Jld 2 (117); EPU 40/200/19/3511(9); JH/100 Jld 22 (27); MBP.600(S)-1/1/1 Jld.4(10)).

Locality Data

1 Locality data was collected through a combination of literature review, fieldwork, and museum specimens.

2 Fieldwork was primarily conducted in Peninsular Malaysia, using bat trapping methods such as harp traps, mist nets, and high nets.

3 Harp traps were placed approximately 20 meters apart, while mist nets and high nets were set up in open spaces within the study area.

4 All traps and nets were deployed from dusk (1900 hrs) to dawn (0700 hrs), and their coordinates were recorded using a Garmin GPSMAP 65s device.

5 Measurements were taken for each captured individual, including forearm length, weight, sex, age, and reproductive status.

6 Species identification was performed using the taxonomic key provided by Kingston et al. (2006).

7 Museum data was obtained from the Zoological Museum of the Malaysian National University (UKM), where locality information for both skull and wet specimens of the species was recorded.

Distribution Map

8 All coordinates collected from literature reviews, fieldwork, and museum records were standardized and saved in decimal degree format.

9 The distribution map was created using QGIS version 3.34.1, with spatial data for each country sourced from GADM version 4.1 (2025).

10 All maps and coordinates were set to the WGS 1984 coordinate reference system (EPSG:4326).

Area of Occupancy (AOO)

11 The Area of Occupancy (AOO) was calculated using the ‘grid’ tool in QGIS version 3.34.1 to create a 2 km x 2 km grid on the map.

Extent of Occurrence

12 The Extent of Occurrence (EOO) was calculated using the IUCN EOO Calculator Toolbox in ArcMap version 10.8.1 (Figure 2).

13 Before running the toolbox, presence, origin, and seasonal codes were assigned to each locality point.

Locations

14 Number of locations is determined by using ‘Google Satellite Image’ function in QGIS.

15 Choose the most probable threat for the species.

16 The number of locations is measured by introducing the threat to the localities.

17 Localities that are eliminated after introducing a single threatening event is considered as one location.

Protocol references

Kingston, T., Lim, BL. and Akbar, Z. 2009. Bats of Krau Wildlife Reserve. 2nd edition. Penerbit Universiti Kebangsaan Malaysia. Bangi.
IUCN Petitions and Standard Committee. 2022. Guidelines for Using the IUCN Red List Categories and Criteria. Version 15.1. Prepared by the Standards and Petitions Committee. https://www.iucnredlist.org/documents/RedListGuidelines.pdf.

Acknowledgements

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