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Agent: Gaia Resources Pty Ltd, Building B, 661
Newcastle Street, Leederville, Western Australia
6007. PO Box 428 Leederville WA 6903.

Specialising in bats and bioacoustics

- Non-invasive remote detection methods
- Identifications from acoustic recordings
- Hire of bat detectors, other video equip.
- Field surveys for whole bat communities
- Targeted surveys for Threatened species
- Resolution of Threatened species issues
- Management and conservation advice
- Long-term monitoring experimental design
- Long-term unattended recording deployment
- Automated identification of large datasets
- Thermal imaging roost counts
- Artificial habitats
- ...and more...please enquire

Servicing (with experience in):

Western Australia and Northern Territory
Papua New Guinea, and surrounds
Indonesia, South East Asia, East Asia

About us

Kyle's experience spans 15 years in both environmental consultancy and research. Completed a PhD on the Pilbara leaf-nosed bat and ghost bat, has published extensively on these, actively continues applied and pure research on them. University-level research on the taxonomy of Australia's Threatened bat species, the evolution of echolocation systems, mammal and reptile taxonomy (molecular systematics, ancient DNA techniques), and population genetics of Threatened species through Australasia / Asia.

Yuki has been involved in bat-related fieldwork, museum collections research, field logistics, interpretation and scientific liaison in East Asia, and bioacoustic data analysis.

Core service

- Our service is designed to reduce your time and cost on bat-related equipment and data handling. Contact Kyle for advice.
- Species identification: recordings from AnaBat SD1/SD2 detectors. Full spectrum recorders (SM2BAT, D500x, Nanobat) for superior detection of particular bat groups.
- Send us data from your own units, or hire our units and return for analysis.
- Equipment handling / data download is performed by associates at Gaia Resources in Leederville, Perth, Western Australia (<http://www.gaiaresources.com.au/sz>) or directly by us. We can courier to you.
- Equipment is subject to our standard hire conditions and can be booked through an online form at the website above, or by contacting Kyle directly.
- Provision of specialist advice on Threatened species.

Quality

Reports from Specialised Zoological adhere to the reporting standards recommended by the Australasian Bat Society, Inc, and survey and analysis methods are consistent with Western Australian and Australian Commonwealth guidelines. Services based on formal training and experience in Zoology to post-doctoral level. Insurance: Professional Indemnity to \$5 million, Public Liability to \$20 million.

Specialist services

Ultra-high frequency bats (leaf-nosed bats)

Extensive understanding of AnaBat system and its effective deployment, including 'continuous recordings' in ZCA. Full spectrum recorders and analysis available.

Ghost bats

Superior detection ability based on acoustic recordings of diagnostic social calls, automated and manual data analysis, full spectrum recordings, and low-light, still and thermal video imagery. Extensive reference call material available.

Cave emergence counts

Thermal imagery camera and missile tracking software system for highly accurate counts of bats emerging from cave roosts.

Targeted surveys for Threatened species

Appropriate and effective non-invasive and remote detection techniques for roost occupancy assessment and site presence.

Remote areas field survey

From the rocky arid of Australia, to the jungles of PNG. Safety and confined space entry training and experience.

Selected consultancy project reports

Aplin, KP and **Armstrong, KN** (2011). Chapter 3. Mammals. pp. 139–338 In: Terrestrial biodiversity analysis for the Frieda River Project. Unpublished report by Ken Aplin Fauna Studies Pty Ltd and Specialised Zoological to Coffey Environments Pty Ltd and Xstrata Frieda River Ltd. 31 Oct 2011.

Armstrong, KN (2011). Goldsworthy bat monitoring: July 2010 – April 2011. Acoustic and video analysis. Unpublished report by Specialised Zoological to BHP Billiton Iron Ore, 2 Sept 2011. [quarterly monitoring reports since Dec 2007]

Outback Ecology (2011). Atlas Iron Ltd Wodgina DSO Project. Quarterly bat monitoring program: September 2010 to June 2011. Unpublished report by Outback Ecology Services Pty Ltd to Atlas Iron Ltd. [design, equipment supply, acoustic analysis, Results and Discussion by **Specialised Zoological**]

Armstrong, KN (2010). Turee Syncline bat monitoring, November 2009. Field survey and acoustic analysis. Unpublished report by Specialised Zoological to Rio Tinto Iron Ore, 29 March 2010.

Armstrong, KN (2009). Jimblebar Iron Ore Project: Bat survey and assessment. Field survey and acoustic analysis. Unpublished report by Specialised Zoological to BHP Billiton Iron Ore, 14 August 2009.

Armstrong, KN (2008). Survey for bats on the Cape Range peninsula. Field survey and acoustic analysis. Unpublished report by Specialised Zoological to the Department of the Environment and Conservation, and the Cape Conservation Group, 20 August 2008.

Full list of publications, reports, current research involvement, request Kyle's *Curriculum Vitae*.

Selected research publications

25. **Armstrong, KN** (2011). The current status of bats in Western Australia. pp. 257–269. In: The Biology and Conservation of Australasian Bats, edited by B Law, P Eby, D Lunney and L Lumsden. Royal Zoological Society of NSW, Mosman, NSW, Australia.

24. **Armstrong, KN** and Kerry, L (2011). Modelling the prey detection performance of *Rhinonicteris aurantia* (Chiroptera: Hipposideridae) in different atmospheric conditions discounts the notional role of relative humidity in adaptive evolution. *Journal of Theoretical Biology* 278: 44–54.

22. **Armstrong, KN** and Aplin, KP (2011). Bats of the Muller Range, Papua New Guinea. Chap. 19, pp. 222–234 In: *Rapid Biological Assessments of the Nakanai Mountains and the upper Strickland Basin: surveying the biodiversity of Papua New Guinea's sublime karst environments*. RAP Bulletin of Biological Assessment 60. Conservation International, Arlington USA.

21. **Armstrong, KN** (2010). Assessing the short-term effect of minerals exploration drilling on colonies of bats of conservation significance: a case study near Marble Bar, Western Australia. *Journal of the Royal Society of Western Australia* 93: 165–174.

17. Yoshino, H, **Armstrong, KN**, Izawa, M, Yokoyama, J and Kawata, M (2008). Genetic and acoustic population structuring in the Okinawa Least Horseshoe Bat: are inter-colony acoustic differences maintained by vertical maternal transmission? *Molecular Ecology* 17: 4978–4991.

15. **Armstrong, KN** and Coles, RB (2007). Echolocation call frequency differences between geographic isolates of *Rhinonicteris aurantia* (Chiroptera: Hipposideridae): implications of nasal chamber size. *Journal of Mammalogy* 88: 94–104.

13. **Armstrong, KN** (2006). Phylogeographic structure in *Rhinonicteris aurantia* (Chiroptera: Hipposideridae): implications for conservation. *Acta Chiropterologica* 8: 63–81.

11. **Armstrong, KN**, Brown, R and Armstrong, P (2005). The status of bat roosts in caves in the south west of Western Australia, with a focus on Quininup Lake Cave. *Western Australian Naturalists* 25: 41–56.

7. **Armstrong, KN** (2001). The roost habitat and distribution of the orange leaf-nosed bat, *Rhinonicteris aurantius*, in the Pilbara region of Western Australia. *Wildlife Research* 28: 95–104.

4. **Armstrong, KN** and Anstee, SD (2000). The ghost bat in the Pilbara: 100 years on. *Australian Mammalogy* 22: 93–101.

Selected book contributions

Commonwealth Government Publications

Department of the Environment, Water, Heritage and the Arts (2010). Survey standards for Australia's threatened bats. DEWHA, Canberra [authored by TB Reardon 2003, peer-reviewed and updated April 2009 by **KN Armstrong**]

Department of the Environment, Water, Heritage and the Arts (2008) Orange leaf-nosed bat (Pilbara form); Semon's leaf-nosed bat; Greater large-eared horseshoe bat. In: *Species Profile and Threats Database (SPRAT)*, Department of the Environment, Water, Heritage and the Arts, Canberra. URL: <http://www.environment.gov.au/sprat>

Armstrong, KN (2008) Pilbara Leaf-nosed Bat *Rhinonicteris aurantia*. pp. 470–471 In: Mammals of Australia 3rd ed (eds. S Van Dyck and R Strahan). Australian Museum, Sydney.

McKenzie, N, **Armstrong, K** and Kendrick, P (1999) Pilbara leaf-nosed bat. In: *The Action Plan for Australian Bats* (eds. A Duncan et al.). Environment Australia, Canberra. 36–38.