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Timothy Wilson

Roads and Maritime Services

Level Ground 1 Simmons Street,

Wagga Wagga NSW 2650

5/04/2015

RE: Echuca Bat Call Peer Review; Contract No. 15.2571.0265

Dear Timothy**,**

As requested, I have undertaken a review of the bat sonograms that were attributed to *Nyctophilus corbeni* following the survey undertaken at the site of the proposed new Echuca - Moama Bridge.

I am of the belief that the call parameter employed by Dr Greg Richards to identify *Nyctophilus corbeni* sonograms (minimum frequency of 35kHz) is not a reliable identification parameter. The reference calls of two species, being *N. geoffroyi* and *N. gouldi* (captured in the Echuca - Moama region) also display calls at a minimum frequency of 35kHz or lower.

Six subject matter experts were consulted on whether individual *Nyctophilus* species could be identified from a specific call parameter. All six experts were of the opinion that with the current technology available for recording bat calls, it is not possible to identify *Nyctophilus* from their call alone.

A review of the Victorian Biodiversity Atlas, BioNet Wildlife Atlas of NSW and Atlas of Living Australia provided historical records of *N. corbeni.* With the exception of the record submitted by Dr Richards to the BioNet Atlas of NSW, the next nearest individual records to the site are near Deniliquin in NSW (70km north of Echuca) and Mitiamo in Victoria (50km west of Echuca). A number of the subject matter experts with whom I consulted during the preparation of this review have extensive trapping experience in the Echuca – Moama region, and are yet to record *N. corbeni*. The only *Nyctophilus* species they have recorded voucher calls for (through capture and release) are *N. geoffroyi* and *N. gouldi*. The consensus between the experts was that suitable habitat for *N. corbeni* is not present within proximity to the site. It is also my experience that *N. corbeni* is readily captured in circumstances where suitable habitat is present. This opinion was supported by the subject matter experts.

Although I reviewed *N. corbeni* distribution maps published in various field guides, and online tools, it is generally accepted that there is a need for caution when relying on such material. Consequently, greater weight was given to a peer reviewed manuscript which provided a detailed account of the distribution of *N. corbeni*. The mapped distribution map of *N. corbeni* in the peer reviewed manuscript does not include the Echuca – Moama region.

When taking into account all the available evidence and advice from subject matter experts, I am of the opinion that it is highly unlikely that *N. corbeni* is present within close proximity to the Echuca – Moama Bridge study site.

The following pages provide details of the process and outcomes of my review that informed my conclusion.

Should you have any queries in relation to my conclusion please do not hesitate to contact me.

A copy of my relevant experience is provided in Attachment - A

Regards,

Rob Gration

Principal Ecologist

EcoAerial Pty Ltd

Introduction

A peer review of calls attributed to *Nyctophilus corbeni* (Corben's Long-eared Bat) at the proposed new Echuca - Moama Bridge was requested by Roads and Maritime Services (RMS). The original bat call analysis for the site was undertaken by Dr Greg Richards. Due to the uncertainties surrounding the positive identification of *N. corbeni* and other species within the Nyctophilus genus, I have undertaken a detailed analysis of the call parameters used by Dr Richards to identify *N. corbeni.*

These following sections provide details of the review process, the results of the review and my professional opinion of the likelihood of *Nyctophilus corbeni* being present at the study site.

Methods

Literature review

I undertook a review of all relevant information pertaining to the identification of *N. corbeni* by bat call analysis. I also reviewed the distribution maps in relevant databases, predicted distribution in a range of field guides and the distribution of the species discussed in a peer reviewed manuscript. The documents and databases reviewed are listed below:

- Atlas of Living Australia.
- BioNet, Atlas of NSW Wildlife, Department of Environment and Heritage.
- Churchill, S. (2008). 2nd Ed. Australian Bats. Jacana Books, Allen and Unwin: Crows Nest NSW.
- Hall, L.S. (2009). A Wild Australia Guide: Bats. Steven Parish Publishing Pty Ltd: Archerfield, Queensland.
- Hall, L.S and Richards, G. C. (1979). Bats of Eastern Australia. Queensland Museum: Brisbane.
- Lumsden, L.F. and Bennett, A.F. (1996). Greater Long-eared, *Nyctophilus timoriensis* in *Mammals of Victoria. Distribution, ecology and conservation.* Menkhorst, P.W. (ed). Oxford University Press: Melbourne.
- Parnaby, H. (2009). A taxonomic review of Australian Greater Long-eared Bats previously known as Nyctophilus timoriensis (Chiroptera: Vespertilionidae) and some associated taxa. Australian Zoologist 35: 39-81. Royal Zoological Society of NSW.
- Pennay, M., Law, B. and Lunney, D. (2011). Review of the distribution and status of the bat fauna of New South Wales and the Australian Capital Territory' in *The Biology and Conservation of Australasian Bats*, Law B, Eby P, Lunney D & Lumsden L (eds), Royal Zoological Society of NSW, Mosman.
- Pennay, M., Law, B., Reinhold, L. (2004). Bat calls of New South Wales: Region based guide to the echolocation calls of Microchiropteran bats. NSW Department of Environment and Conservation, Hurstville.
- Reardon, T.B. and Flavel, S.C. (1987). A guide to Bats of South Australia. South Australian Museum and Field Naturalist Society of South Australia.
- Reinhold, L., Law, B., Ford, G. and Pennay, M. (2001). Key to the bat calls of south-east Queensland and north-east New South Wales. Queensland Government – Natural Resources and Mines, State Forests of NSW, University of Queensland and New South Wales National Parks and Wildlife.

- Turbill, C., Lumsden, L. F. and Ford, G.I. (2013). South-eastern Long-eared Bat *Nyctophilus corbeni* in *Field Companion to the Mammals of Australia.* Van Dyck, S., Gynther, I. and Baker, A. New Holland: Chatswood, NSW.
- Victorian Biodiversity Atlas, Department of Environment Land Water and Planning.

Bat call review process

The original approach was to review only those bat calls attributed to *N. corbeni* and *Nyctophilus sp* by the sub-consultant, Dr Greg Richards. However, Dr Richards had not retained the original analysed call files. As a consequence, I requested all the raw bat files so I could cross reference these with the bat call result tables provided by Dr Richards. These tables detailed the sites, the recording dates and the number of calls attributed to *N. corbeni*.

I also requested any documents or reports written by Dr Richards supporting his identification of calls as *N. corbeni*. In particular, I wanted to view the call images (as per the Australian Bat Society reporting guidelines) including the legend providing the call parameters. The call images in a report provided to VicRoads by Dr Richards did not include the call parameter details. Despite a request for the complete call images, these were not provided. I also did not consider Dr Richards reference to Churchill (2000) in his document as a reliable guide for identifying *N. corbeni* calls.

Upon receiving the raw bat call files and the relevant documents, I retrieved all calls that could be attributed to *Nyctophilus* species and calls where a minimum frequency of 35kHz was recorded. I assessed the call parameter Dr Richards used for identifying *N. corbeni* against reference calls of *Nyctophilus* species recorded in NSW and Victoria.

Please note: Reference calls are recordings of bats identified in the hand after capture and then released.

Subject Matter Expert Consultation

I consulted with a number of leading bat researchers, all of whom are acknowledged for their expertise in analysing bat calls and all of whom have experience with *N. corbeni*:

- Chris Corben: Hardware and software developer of Anabat bat detector system.
- Dr Lindy Lumsden; Department of Environment, Land, Water and Planning.
- Dr Brad Law; Department of Primary Industries Forest Science Centre, NSW.
- Michael Pennay; Office of Environment and Heritage, NSW.
- Terry Reardon; South Australian Museum.
- Greg Ford; Balance Environmental.

Results

Bat call analysis review

The review of reference calls for *N. geoffroyi* and *N. gouldi* in the Riverina region provides clear examples of calls with a minimum frequency of 35kHz- the frequency used by Dr Richards to describe calls as those of *N. corbeni.* Calls potentially attributed to *N. corbeni* by Dr Richards were compared with the reference calls of *N. corbeni, N. geoffroyi* and *N. gouldi,* and it was apparent that the calls could not be identified to any one species of Nyctophilus. An example of *N. geoffroyi* and *N. gouldi* calls are provided below, note that the *N. gouldi* call has a minimum frequency of 30kHz. Further examples are provided in Attachment B.

Figure 1: *Nyctophilus geoffroyi call*

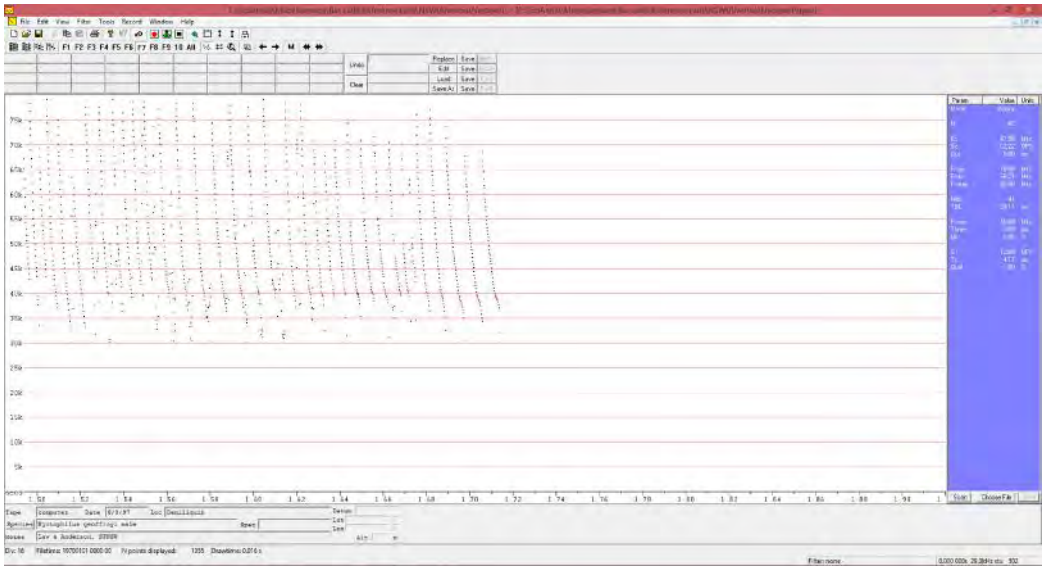
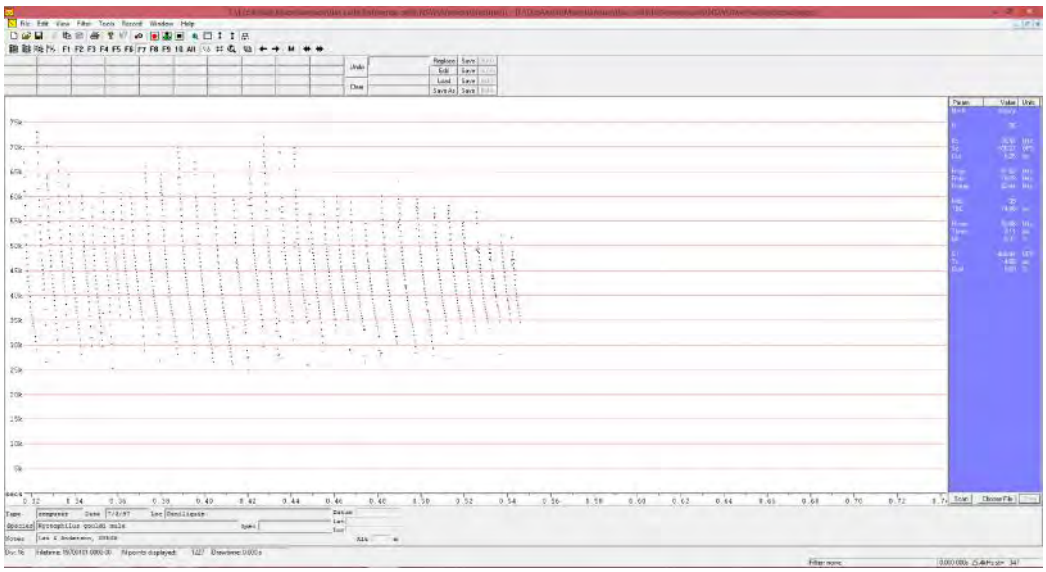


Figure 2: *Nyctophilus gouldi* call



As was the case with the Riverina calls, the Victorian reference calls of *N. geoffroyi* and *N. gouldi* also overlaps with the call parameter Dr Richards used for identifying *N. corbeni*. Two examples are provided below, the *N. geoffroyi* minimum frequency is 30kHz and *N. gouldi* 35kHz. Further examples are provided in Attachment C.

Figure 3: *Nyctophilus geoffroyi* call

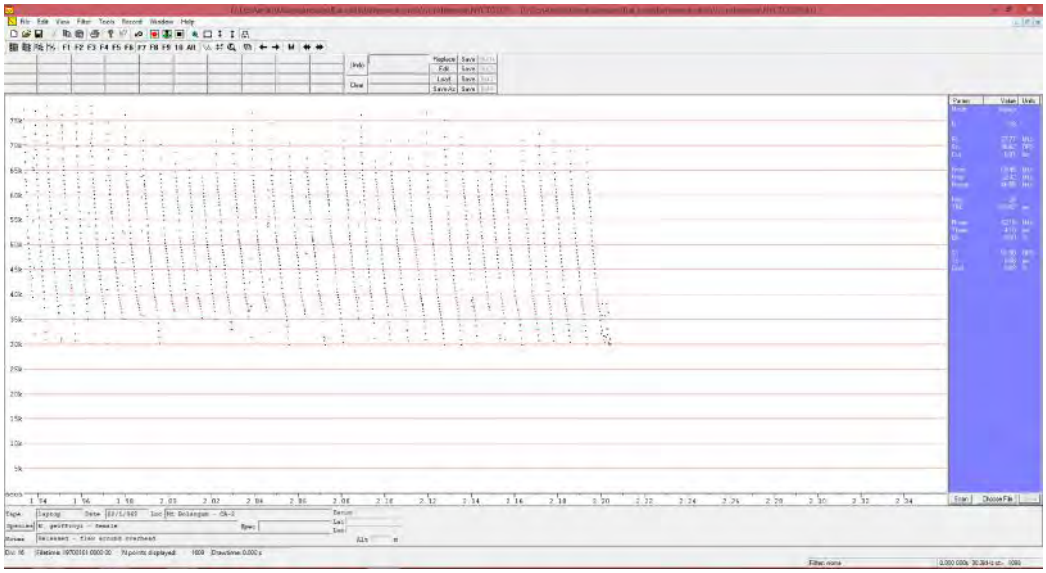
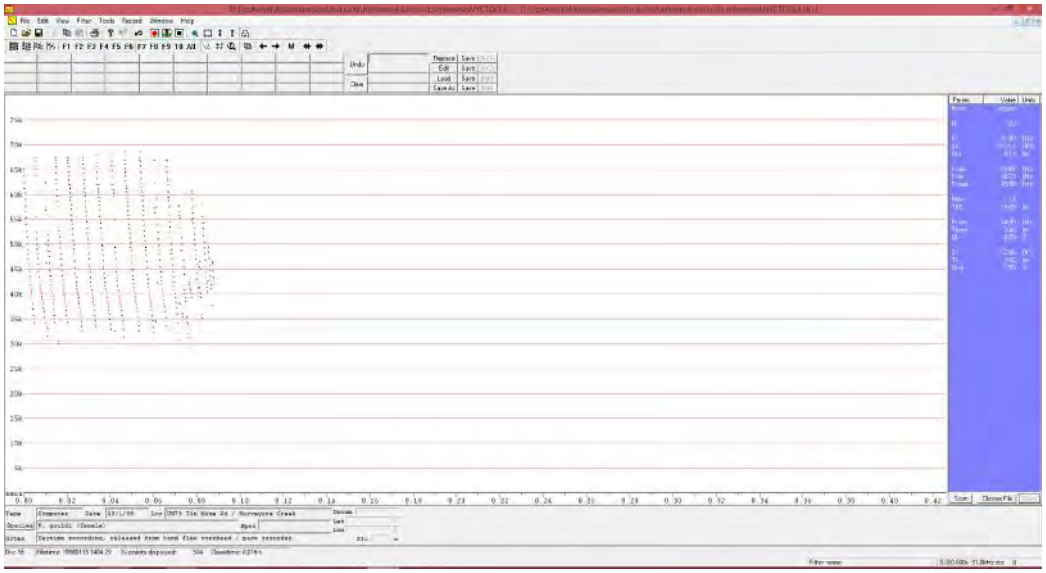


Figure 4: *Nyctophilus gouldi* call



Subject Matter Expert Feedback

Although the reference calls in my opinion, provide conclusive evidence that *N. corbeni* cannot be identified from *N. geoffroyi* and *N. gouldi* using any specific call parameter*,* advice was sought from the following subject matter experts; Chris Corben, Dr Lindy Lumsden, Terry Reardon, Dr Brad Law, Michael Pennay and Greg Ford. The question asked was: "*What are your views on the use of 35khz minimum call frequency parameter as the sole basis for identifying N. corbeni"*.

A summary of the relevant experience of each expert, and their responses to the question are provided below:

Chris Corben - Designer / developer of the Anabat Detector and bat call analysis system.

The Anabat system® developed by Chris is used worldwide. Chris is contracted by government agencies in Australia and United States to undertake bat surveys using his Anabat system. This was the system used by Dr Richards for his analysis.

"Even bats with steep calls (eg Myotis elsewhere) can vary their calls a great deal according to flying conditions, and I have long been amazed at the variety of call shapes which Nyctophilus produce. If they can be identified acoustically, I would expect that to come from a detailed knowledge of the interactions between call shape, frequency, slope and repetition rate. I don't think you should expect to be able to identify them based on a single character, though that might work if you were careful to only compare calls of a specific type".

Dr Lindy Lumsden - Section Leader Wildlife Ecology, Arthur Rylah Institute, Department of Environment, Land, Water and Planning, Victoria.

Lindy is internationally recognised as an expert on the ecology and conservation of insectivorous bats. She is a member of the IUCN Chiropteran Specialist Group and sits on the editorial board of the international journal Acta Chiropterologica. Lindy has co-supervised 14 Honours, Masters and PhD students, on a wide range of bat studies. Lindy has presented, or been a co-author, on over 60 conference papers at national and international conferences. Lindy was the lead advisor for the developer (Matt Gibson) of automated bat call analysis software, Anascheme, and developed keys to distinguish between species for use in the software.

"We included a large number of reference calls of all three Nyctophilus *species when developing the keys for Anascheme. The keys use a wide range of call parameters to distinguish between species, rather than just a single feature. The minimum frequency of our reference calls of N. corbeni, N. geoffroyi and N. gouldi, overlapped considerably, and we could not distinguish them on that basis. However, using a sophisticated machine learning process that factored in many call parameters, we had hoped that we might be able to distinguish between the three species. Unfortunately, even with this extra information the reliability of correctly identifying these too species was so low that we have combined all three species into a single species complex, rather than to species. <u>As the expert reviewer of bat records for the Victorian Biodiversity Atlas, I do not accept any records submitted where the species of Nyctophilus has been recorded based on echolocation call identification</u>".*

Dr Brad Law - Principal Research Scientist in Department, of Primary Industry Forest Science Centre.

Brad has a background in zoology and ecology and his personal research program over the last 20-years has focused on aspects of bat ecology. Brad has co-supervised a number of students in recent years investigating microbats in the urban environment of Sydney. Brad is co-editor of Australia's oldest zoological journal: Australian Zoologist and co-authored the following two bat call field guides:

Pennay, M., Law, B. and Reinhold, L. (2004). Bat Calls of New South Wales; Region based guide to the echolocation calls of microchiropteran bats. Department of Environment and Conservation (NSW), State Forest of NSW.

Reinhold, L., Law, B., Ford, G. and Pennay, M. (2001). Key to the bat calls of south-east Queensland and north-east NSW ; Queensland Department of Natural Resources and Mines, State forest of NSW, University of Southern Queensland and New South Wales National Parks and Wildlife Service.

"'I have found no consistent basis for distinguishing any of the Nyctophilus based on the calls. We regularly record N. gouldi and N. geoffroyi calling below 35 kHz''.

Michael Pennay – Office of Environment and Heritage, NSW.

Michael is acknowledged as one of Australia's leading bat researchers. Michael's experience also extends to New Guinea where he regularly undertakes fieldwork. Michael has authored and co-authored many bat related manuscripts, species descriptions and provided advice on bat survey techniques. Michael undertook a systematic bat survey across NSW to develop bat call guides for NSW and, southern Queensland:

Pennay, M., Law, B. and Reinhold, L. (2004). Bat Calls of New South Wales; Region based guide to the echolocation calls of microchiropteran bats. Department of Environment and Conservation (NSW), State Forest of NSW.

Reinhold, L., Law, B., Ford, G. and Pennay, M. (2001). Key to the bat calls of south-east Queensland and north-east NSW ; Queensland Department of Natural Resources and Mines, State forest of NSW, University of Southern Queensland and New South Wales National Parks and Wildlife Service.

''I cannot differentiate N. corbeni from other Nyctophilus species on any parameter, especially not something as obvious as minimum frequency, in any location".

Greg Ford – Director/ Principal Ecologist, Balance! Environmental, Queensland.

Greg is a terrestrial ecologist with over 25-years experience. Greg specialises in microbat echolocation call interpretation using both zero-crossing analysis and full-spectrum data sets. Greg has extensive knowledge of the AnalookW, Kaleidoscope and SongScope software and the use of associated detector systems (Anabat, Songmeter and Echometer). Greg provides bat call analysis training on the behalf of the developers of the Anabat system, Titley Electronics. Greg is a co-author of the following bat call field guide:

Reinhold, L., Law, B., Ford, G. and Pennay, M. (2001). Key to the bat calls of south-east Queensland and north-east NSW ; Queensland Department of Natural Resources and Mines,

State forest of NSW, University of Southern Queensland and New South Wales National Parks and Wildlife Service.

''I concur with your observations and those of Pennay and others that N. corbeni is indistinguishable from N. gouldi. I have reference calls from southern inland Qld, collected from individuals of each species caught in the same trap. Their minimum frequencies both drop to as low as 35 kHz and there is no apparent difference in factors such as Time Between Calls (TBC), Duration or Slope''.

Terry Reardon – Evolutionary Biologist, South Australia Museum, South Australia.

Terry has been at the forefront of bat research for over 30 years. His recent and current work on bats includes: resolving taxonomic issues using molecular and morphological techniques, development of echolocation call libraries and call identification, writing national survey standards, assessments of the threatened status of bats developing innovative survey methods including radar surveillance and thermal imaging counts of cave-bat populations. Terry's PhD is focusing on reviewing the taxonomic status of the *Mormopterus* genus (free-tail bats).

"Using a minimum frequency of 35kHz is not a reliable parameter to distinguish Nyctophilus corbeni from other species; the common and widespread N. geoffroyi often exhibits calls that have series of pulses with minimum frequencies that fall below 35kHz''

At present there are no published keys to distinguish *N. corbeni* calls from other co-occurring Nyctophilus species.

Distribution maps

It is generally accepted that there is a need for caution when relying on field guide distribution maps and public online mapping tools, as they are provided as a guide only. In the case of the *Field Companion to the Mammals of Australia*, the editors state that the distribution maps are to be considered as a crude guide only (van dyke 2013). As a consequence, the peer reviewed manuscript (Pennay et al 2011) took precedence in my review. In this manuscript the authors analysed 121,518 records, 36,109 of which were excluded as suspect records.

The records included were based on reliable observations; trapped, shot, observed, roost, road kill, cat kill, fox kill, dog kill, bones / teeth and owl pellet. The only bat calls included were those species audible to humans, *Tadarida australis*, *Saccolaimus flaviventris* and *Mormoterus beccarii*. The distribution maps in this manuscript are by far the most reliable records of bat species in NSW.

Of the three Nyctophilus species known to occur in southern NSW and the ACT, *N. geoffroyi* is the most common across NSW and the study area. *N. gouldi,* although not as common *as N. geoffroyi,* has also been recorded in the study area. The distribution maps for *N. corbeni, N. geoffroyi* and *N. gouldi* are provided below (Figures 5~7).

Figure 5: *N. corbeni* distribution

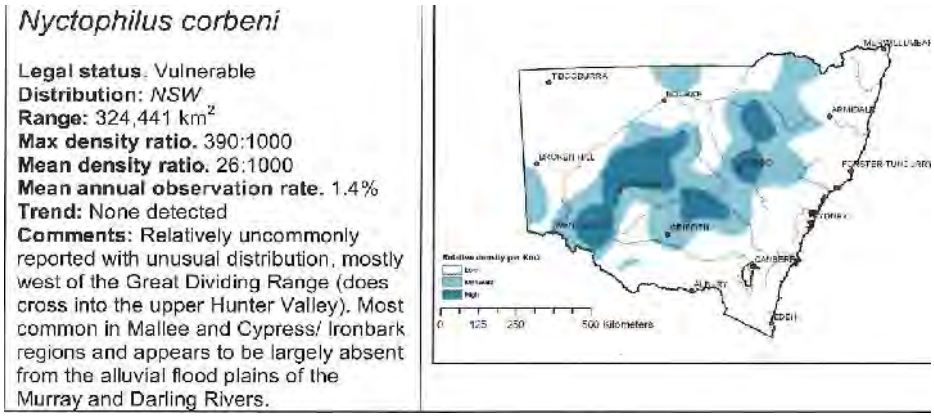


Figure 6: *N. geoffroyi* distribution

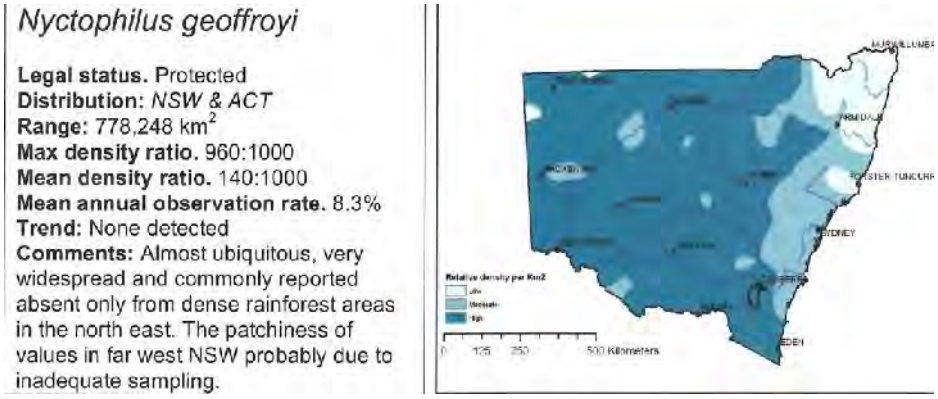
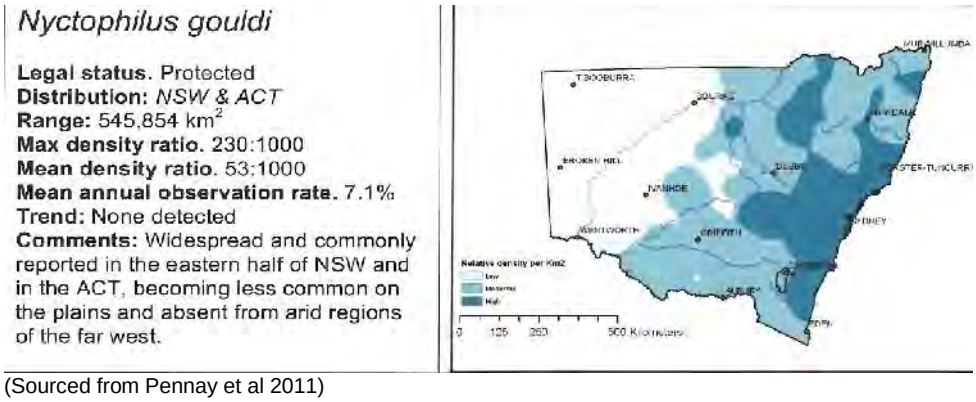


Figure 7: *N. gouldi* distribution



(Sourced from Pennay et al 2011)

A review of the state based database distribution maps for *N. corbeni* indicate that with the exception of the Richards bat call record, the closest accepted records are 70km to the north and 50km to the south-west (Atlas of Living Australia, Wildlife Atlas of NSW and Victorian Biodiversity Atlas). Maps of *N. corbeni* records from the Atlas of Living Australia and print based site records in Victoria are provided in Attachment D.

A review of the literature of where *N. corbeni* has been recorded indicates a preference for dryer habitat i.e. mallee, open woodlands and savannahs (Churchill 2009, Hall 2009, Lumsden and Bennett 1996, Pennay et al 2011, Richards and Hall 1979, Reardon and Flavel 1987 and Lumden et al 2013). This habitat is not present within the study site.

Subject Matter Expert Feedback

I sought further advice from subject matter experts with relevant *N. corbeni* trapping experience in the study area. Their responses are provided below.

Michael Pennay

''I have only ever caught N. corbeni in mallee or cypress country. There are no reliable capture records I'm aware of from NSW in the Riverina''.

Dr Brad Law

"I did a survey of the red gum forests of Millewa many years ago and did not record the species (Law and Anderson 1999). My feeling is it is unlikely to be recorded in extensive stands of red gum forests".

Dr Lindy Lumsden

"*I have undertaken extensive bat surveys across northern Victoria during my PhD and while undertaking state based surveys with Arthur Rylah Institute (Victorian governmental research department). The only N. corbeni I trapped was one individual in Black Box Woodland to the south-west of Echuca. Most records from Victoria are further north in mallee or bulloke habitats which is more typical for this species''.*

It is my experience that *N. corbeni* are readily caught in areas they are present, this observation was also supported by a number of subject matter experts the researchers I consulted.

Conclusion and recommendation

After reviewing all of the available evidence and evaluating the feedback from subject matter experts, I am of the opinion that it is highly unlikely that *N. corbeni* is present within the study area.

As *N corbeni* is unlikely to be present within the study area, I consider the requirement for a Species Impact Statement and Referral to the Commonwealth Department of the Environment to be unnecessary.

Attachment A – Rob Gration Curriculum Vitae

Rob Gration

Principal Ecologist

Career Summary

Rob has 20-years professional experience in the resource management sector and has undertaken projects throughout Victoria, Queensland, New South Wales and South Australia as an environmental consultant.

Rob's specific area of expertise is environmental assessment, management and monitoring. Rob provides advice on environmental compliance, impact assessment and monitoring, preparation of referrals under the *Environment Protection & Biodiversity Conservation Act 1999* & relevant state acts, Environmental Effect Statements and Environmental Management Plans.

Professional History

- 2013 - EcoAerial; Director
- 2011 – 2013: WSP Ecology Solutions; Business Unit Leader
- 2010 – 2011: SMEC; Principal Ecologist / Team Manager
- 2009 – 2010: Ecological Consulting Services; Business Owner / Ecologist
- 2007 – 2009: Parsons Brinckerhoff; Principal Scientist
- 2006 – 2007: Environmental and Biodiversity Services; Senior Ecologist
- 1999 – 2006: Ecological Consulting Services; Business Owner / Ecologist
- 1998 – 2007: Northern Melbourne Institute of TAFE; Senior Lecturer / Trainer
- 1995 – 1998: Brimbank City Council; Director, Gardenbiz training program for youth
- 1995 1995: Wyndham City Council; Team leader environmental training programs

Education and Training

- Master of Wildlife Management (Habitat), Macquarie University
- Post Graduate Certificate in Applied Science (Wildlife Ecology/Management), Charles Sturt University
- Associate Diploma Applied Science (Natural Resource Management), NMIT
- A-Grade Bat Banding Authority, Australian Bird and Bat Banding Scheme.

Professional Memberships

- Ecological Consultants Association of NSW
- Australasian Bat Society; past president and executive member
- Royal Zoological Society of NSW; Scientific Member

Bat Related Publications

Rob has published the following manuscripts:

Gration, R. (2011). Can radar technology overcome the current limitations of surveying for Miniopterus schreibersii bassanii Southern Bent-wing Bats at wind farms? Proceedings of joint Symposium of the Royal Zoological Society of NSW and the Australasian Bat Society on the Biology and Conservation of Australasian Bats.

Gration, R. (2008). Bat detectors: Are they the silver bullet for applying the 3r's of animal welfare when undertaking field based surveys for bats? Proceedings of the National conference of: Australia and New Zealand Council for the Care of Animals in Research and Teaching: Melbourne

Gration, R. (2006). Protection of a Subterranean Roost of the Eastern Bent-wing Bat Miniopterus schreibersii oceanensis in South Eastern Australia. Australasian Bat Society Newsletter. No 27.

Gration, R. (2006). Will the use of a bats social call be effective in increasing bat activity and capture rates? Australasian Bat Society Newsletter. No 27.

Gration, R. (2006). A pontoon system for operating a harp trap on lakes, creeks, dams and rivers. Australasian Bat Society Newsletter. No 27.

Gration, R. (2006). Using an IPAQ PDA (Personal Digital Assistant) with AnaPocket and Storage ZCAIM. Australasian Bat Society Newsletter. No 27.

Gration, R. (2003). A solution to the problem of harp trap line relaxation when used in the tropics or arid zones. Australasian Bat Society Newsletter. No 21.

Gration, R. (2003). The stringing of a Harp trap; the desirable qualities to look for in a monofilament line. Australasian Bat Society Newsletter. No 21.

Gration, R. (2003). PRODUCT REVIEW A Real-time Portable Data Logger Australasian Bat Society Newsletter. No 21.

Gration, R. (2003). Design and Construction of a Triple-bank Harp Trap. Bat Research News Vol. 44 No 3. pp. 84-86.

Gration, R. (2002). Harp trap design: where do we go from here? Australasian Bat Society Newsletter. No 19. pp. 6-11.

Gration, R. (2002). Standardizing methods when using Anabat detectors. Australasian Bat Society Newsletter. No 19. pp. 11-12.

Gration, R. (2000). Gration Bat Trap. Australasian Bat Society Newsletter. No 14. pp. 5-6.

Gration, R. (1999). The Simple Bat Detector. Australasian Bat Society Newsletter. No 13. p.20.

Peer review & client reviews

Peer review Financiers Revue – National Bank (Tasmania)

Principal ecologist responsible for reviewing strategies at two operational wind farms of EPBC Act protected avian and fauna species, including habitat protection, species conservation and offsets?

Peer review of Bald Hills Wind Farm – Mitsui (Gippsland, Victoria)

Principal ecologist engaged by the owner's engineers to undertake a peer review of all bird and bat l assessments undertaken by sub-contracted environmental consultants.

Due Diligence Review – Confidential Client (Queensland)

Principal ecologist responsible for assessing the biodiversity issues of the Queensland Government Wind Farm assets for six operational and 14-sites at concept stage.

Expert witness statement and representation – Wind Farm Developments (Victoria)

Engaged as an expert witness for a Department of Sustainability and Environment Panel hearing and VCAT hearing to present evidence in relation to biodiversity studies at two proposed wind farms in south west Victoria.

Peer review of fauna mitigation strategies for Sugarloaf Pipeline - North South Pipeline Alliance (Victoria)

Responsible for reviewing a post construction fauna management plan for a state listed threatened species, the Brush-tailed Phascogale. Recommended alternative strategies that both provided better outcomes for brush- tailed phascogale whilst reducing the budgeted cost to the client.

Peer review of preferred tenderer - North South Pipeline Alliance (Victoria)

Responsible for reviewing post construction fauna monitoring program. Involved providing recommendations for the proposed monitoring program to ensure it met the requirements of the referral authority, the Department of Sustainability and Environment.

Summary of selected bat related projects

Linear Projects

Olympic Highway realignment – Roads and Maritime Services (Kapooka, NSW)

Contracted to undertake targeted surveys for 4 threatened microbats within the construction footprint and, at a regional scale.

Hume Highway upgrade – Road Traffic Authority (Tarcutta NSW)

Principal ecologist responsible for undertaking wildlife surveys as part of the EIA process for the Hume Highway Tarcutta by-pass.

Hume Highway upgrade - Road Traffic Authority (Holbrook NSW)

Principal ecologist responsible for undertaking wildlife surveys as part of the EIA process for the Hume Highway Holbrook by-pass.

Narrabri to Wellington Gas Pipeline – ERM (NSW)

Principal ecologist responsible for undertaking wildlife surveys as part of the EIA process of a proposed pipeline route through private property and public land.

Resource Sector

Targeted bat surveys – Iluka Resources (Nullarbor Desert, South Australia)

Engaged to undertake targeted bat surveys for the EPBC listed Greater Long-eared Bat at Jacinth.

Bat surveys at Western Treatment Plant – Melbourne Water (Werribee, Victoria)

Principal ecologist responsible for survey design and implementation of bat surveys using trapping techniques. Objectives were to assess the species of bat present, activity levels and habitat use.

Bat Surveys at Eastern Treatment Plant and Edithvale-Seaford Wetlands – Melbourne Water (Seaford, Victoria)

Principal ecologist responsible for survey design and implementation of bat surveys using bat detectors (sound recording). Objectives were to assess the species of bat present, activity levels and habitat use.

Biodiversity Assessment – Idemitsu (Boggabri, NSW)

Principal ecologist responsible for undertaking wildlife surveys as part of the EIA process for the expansion of a Coal Mine within the existing mining lease, private property and conservation reserve.

Biodiversity Assessment - Confidential Client (Armidale, NSW)

Principal ecologist responsible for undertaking habitat assessment and assessing if cave dwelling bats were present in a decommissioned mine.

Biodiversity Assessment – Wesfarmers (Blackwater Creek, Queensland)

Principal ecologist responsible for writing habitat / fauna management plan for EPBC Act listed species as per EPBC Act 'controlled action' conditions at the Curragh East Coal Mine (Qld).

Biodiversity Assessment - Wesfarmers (Blackwater Creek, Queensland)

Principal ecologist responsible for undertaking ecological surveys as part of the EIA process for the expansion of an existing coal mine lease at the Curragh East Coal Mine (Qld).

Biodiversity Assessment – Confidential Client (Leigh Creek, South Australia)

Principal ecologist responsible for undertaking wildlife surveys as part of the EIA process for the expansion of a Zinc mine.

Innovation

Bat Call Recording and Analysis – Various (Australia wide)

Contracted to deploy bat detectors at project sites to record the presence of microbats. Endorsed by state authorities to undertake bat call analysis to identify species.

Can radar technology overcome the current limitations of surveying for *Miniopterus schreibersii bassanii* Southern Bent-wing Bats at wind farms? - Royal Zoological Society of NSW.

Investigated the use of radar to provide quantitative data to assess the impact of bat collisions with turbine blades at wind farms.

Renewable Energy sector

The ecological implications of wind turbines for birds and bats – Confidential Client (Victoria)

Principal ecologist responsible for undertaking a desktop review of the environmental implications of wind energy development at four confidential sites.

Preliminary Ecological Assessment – Wind Farm Developments (Naroghid, Victoria)

Principal ecologist responsible for an ecological assessment of a proposed wind farm facility in south-west Victoria. The objectives were to identity potential flora / fauna issues and, provide recommendations for further studies.

Wind Farm Biodiversity Survey – Wind Farm Developments (Woolsthorpe, Victoria)

Principal ecologist responsible for overseeing vegetation survey, and habitat assessment of associated infrastructure, including substations, transmission lines, cables and tracks. The project included the identification of threatened species and assessing the likely impacts of the project.

Bird and bat habitat use assessment - Wind Farm Developments (Drysdale, Victoria)

Principal ecologist responsible for conducting a spring bird census at the Drysdale Wind Farm in south-west Victoria. The objectives of the assessment were to assess the likely occurrence of birds and bats listed under the Flora and Fauna Guarantee Act, and Victorian Rare or Threatened species.

Targeted Species Survey – Wind Farm Developments (Drysdale and Woolsthorpe)

Principal ecologist responsible for survey design to establish the presence of the National and State threatened Southern Bent-wing Bat and other bats within two proposed Wind Farms in south-west Victoria.

Threatened Species Surveys

Monitoring movement of a state listed bat between two roost sites – Parks Victoria (Kinglake National Park, Victoria)

Principal ecologist responsible for implementing banding program to monitor the movement of the threatened Eastern Bent-wing Bat between two mine shaft roosts. Project is funded by the Victorian Bushfire Rehabilitation and Recovery Authority.

Targeted surveys of threatened bats – Parks Victoria (Kinglake National Park, Victoria)

Principal ecologist responsible for implementing Anabat (sound recording) and trapping surveys to assess the effects of the Black Saturday Bushfires on threatened bats.

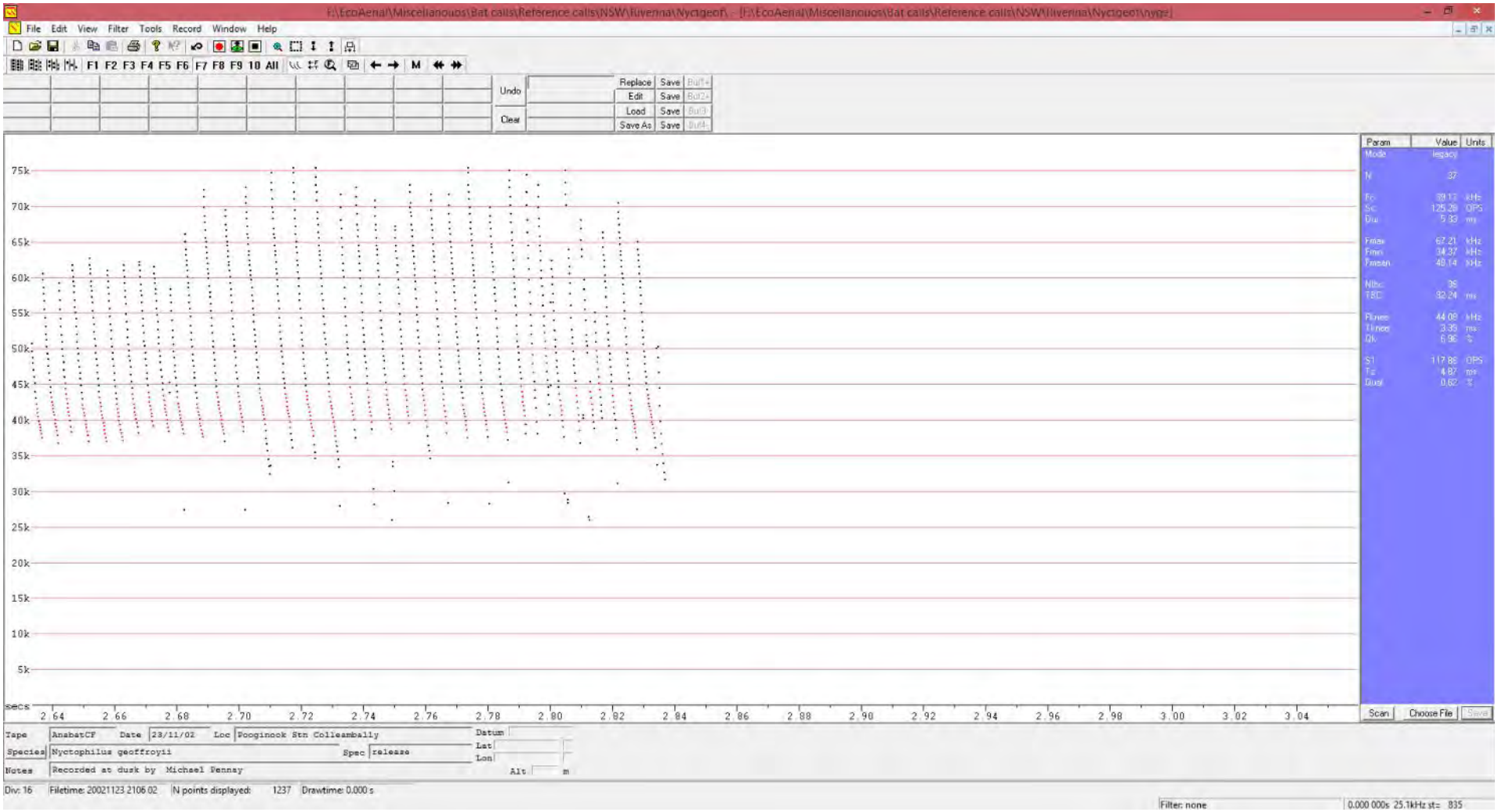
Habitat Protection and Risk Management – Parks Victoria (Broadford, Victoria)

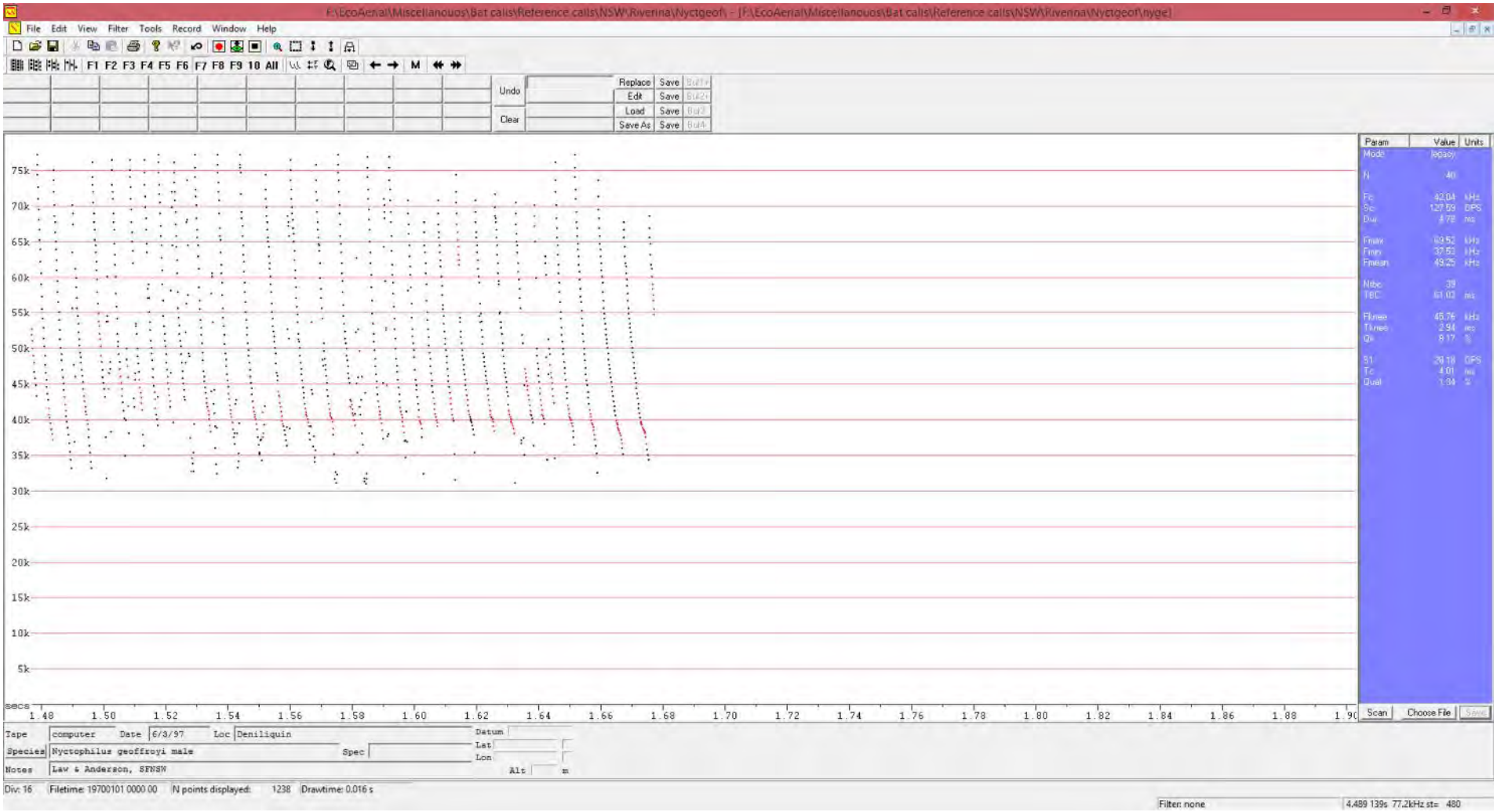
Designed and installed a bat gate for Parks Victoria at a disused mineshaft. The aim of the project was to restrict human access whilst allowing the threatened Eastern Bent-wing Bat access to their roost.

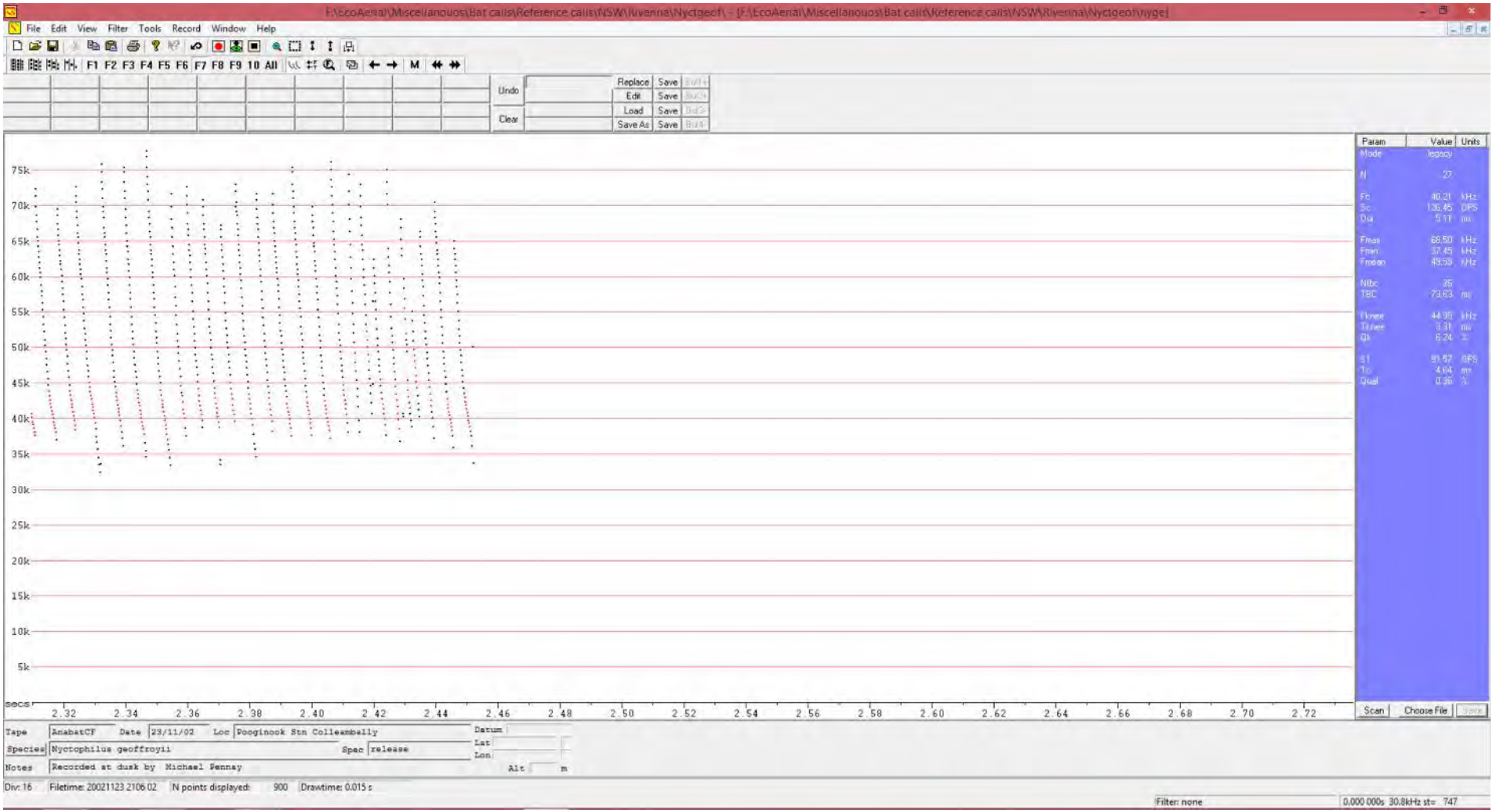
Attachment B – *Nyctophilus geoffroyi* and *N. gouldi* reference calls, Riverina Region NSW

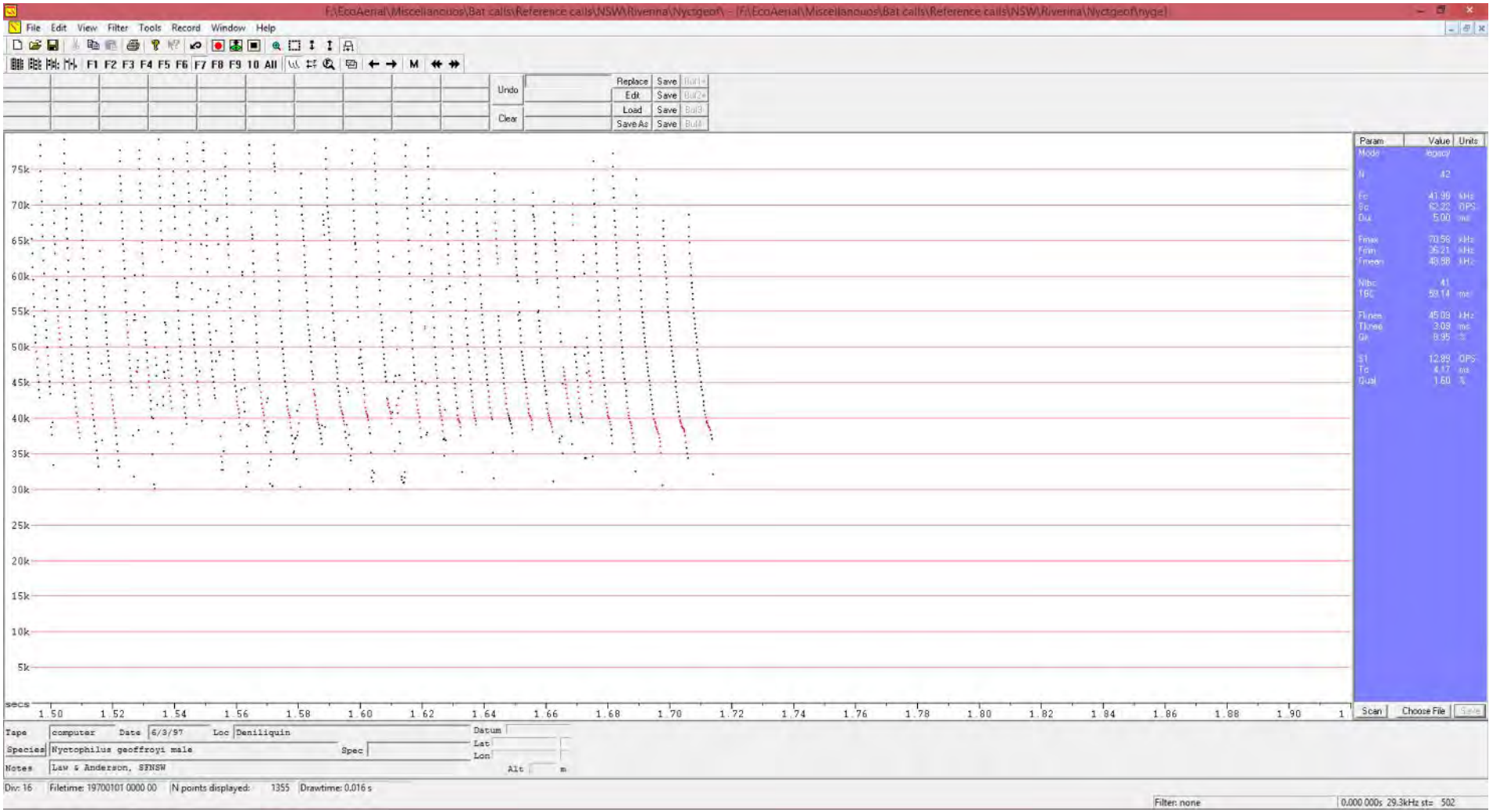
Nyctophilus geoffroyi

Riverina Reference calls (Pennay et al 2002)


File Edit View Filter Tools Record Window Help
F1 F2 F3 F4 F5 F6 F7 F8 F9 10 All
Undo
Clear
Replace Save
Edit Save
Load Save
Save As Save
Param Value Units
Mode legacy
N 37
Fc 39.13 kHz
Sc 125.28 OPS
Dur 5.93 ms
Fmax 67.21 kHz
Fmin 34.37 kHz
Fmean 48.14 kHz
Nthc 98
TBC 92.24 ms
Fknee 44.09 kHz
Tknee 3.35 ms
Qk 6.96 %
S1 117.86 OPS
Tz 4.87 ms
Qual 0.62 %
75k
70k
65k
60k
55k
50k
45k
40k
35k
30k
25k
20k
15k
10k
5k
secs
2.64 2.66 2.68 2.70 2.72 2.74 2.76 2.78 2.80 2.82 2.84 2.86 2.88 2.90 2.92 2.94 2.96 2.98 3.00 3.02 3.04
Scan Choose File Save
Tape AnabatCF Date 23/11/02 Loc Pooginook Stn Colleambally Datum
Species Nyctophilus geoffroyii Spec release Lat
Notes Recorded at dusk by Michael Pennay Lon
Alt m
Div: 16 Filetime: 20021123 2106 02 N points displayed: 1237 Drawtime: 0.000 s
Filter: none
0.000 000s 25.1kHz st= 835

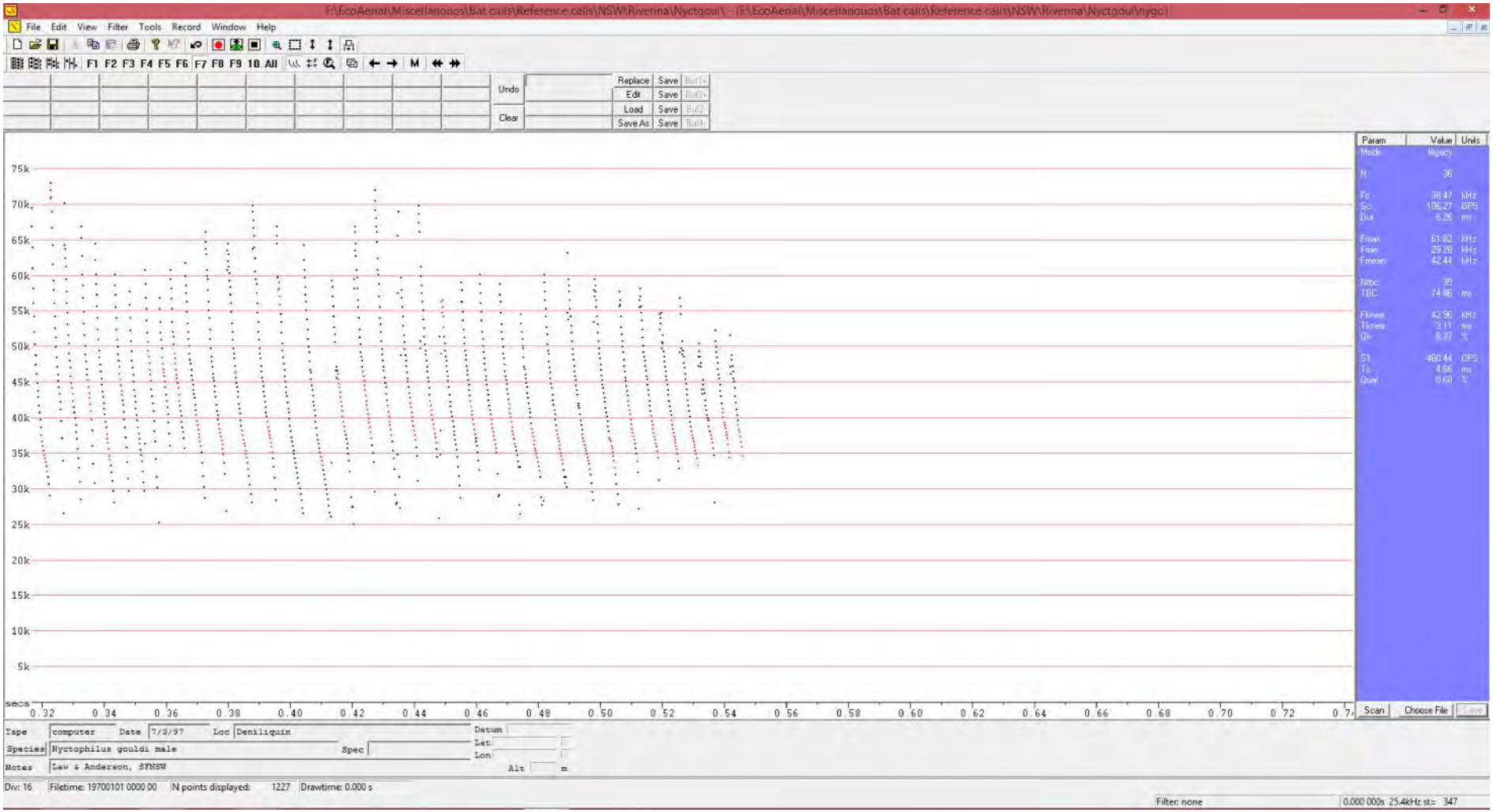

F:\EcoAerial\Miscellanouos\Bat calls\Reference calls\NSW\Riverina\Nyctgeof\ - [F:\EcoAerial\Miscellanouos\Bat calls\Reference calls\NSW\Riverina\Nyctgeof\nyge]
File Edit View Filter Tools Record Window Help
F1 F2 F3 F4 F5 F6 F7 F8 F9 10 All M
Undo
Clear
Replace Save
Edit Save
Load Save
Save As Save
75k 70k 65k 60k 55k 50k 45k 40k 35k 30k 25k 20k 15k 10k 5k
secs
1.48 1.50 1.52 1.54 1.56 1.58 1.60 1.62 1.64 1.66 1.68 1.70 1.72 1.74 1.76 1.78 1.80 1.82 1.84 1.86 1.88 1.90
Param Value Units
Mode legacy
N 40
Fc 42.04 kHz
Sc 127.59 DPS
Dur 4.78 ms
Fmax 59.52 kHz
Fmin 37.53 kHz
Fmean 49.25 kHz
Nbc 39
TBC 61.03 ms
Fknee 46.76 kHz
Tknee 2.94 ms
Qk 8.17 %
S1 29.18 DPS
Tc 4.01 ms
Qual 1.94 %
Scan Choose File Save
Tape computer Date 6/3/97 Loc Deniliquin
Species Nyctophilus geoffroyi male Spec
Notes Law & Anderson, SFNSW
Datum
Lat
Lon
Alt m
Div: 16 Filetime: 19700101 0000 00 N points displayed: 1238 Drawtime: 0.016 s
Filter: none
4.489 139s 77.2kHz st= 480

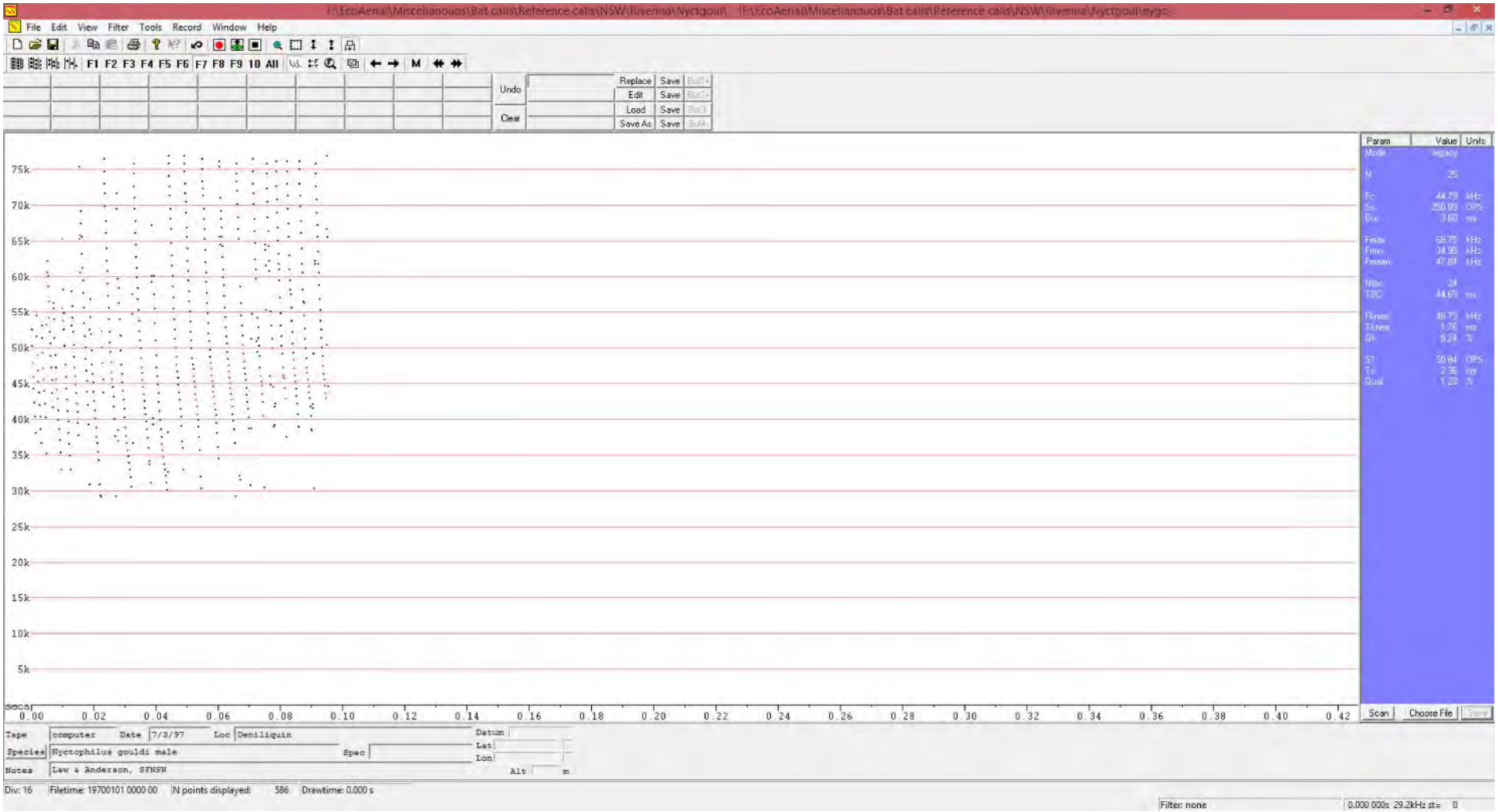

File Edit View Filter Tools Record Window Help
F1 F2 F3 F4 F5 F6 F7 F8 F9 10 All M
Undo
Clear
Replace Save
Edit Save
Load Save
Save As Save
Param Value Units
Mode legacy
N 27
Fc 40.21 kHz
Sc 136.45 DFS
Dur 5.11 ms
Fmax 68.50 kHz
Fmin 37.45 kHz
Fmean 49.59 kHz
Nlbc 26
TBC 73.63 ms
Fknee 44.95 kHz
Tknee 3.31 ms
Qk 6.24 %
s1 91.57 DFS
Tc 4.64 ms
Qual 0.36 %
75k
70k
65k
60k
55k
50k
45k
40k
35k
30k
25k
20k
15k
10k
5k
secs
2.32 2.34 2.36 2.38 2.40 2.42 2.44 2.46 2.48 2.50 2.52 2.54 2.56 2.58 2.60 2.62 2.64 2.66 2.68 2.70 2.72
Scan Choose File
Tape AnabatCF Date 23/11/02 Loc Pooginook Stn Colleambally
Species Nyctophilus geoffroyii Spec release
Notes Recorded at dusk by Michael Pennay
Datum
Lat
Lon
Alt m
Div: 16 Filetime: 20021123.2106.02 N points displayed: 900 Drawtime: 0.015 s
Filter: none
0.000 000s 30.8kHz st= 747

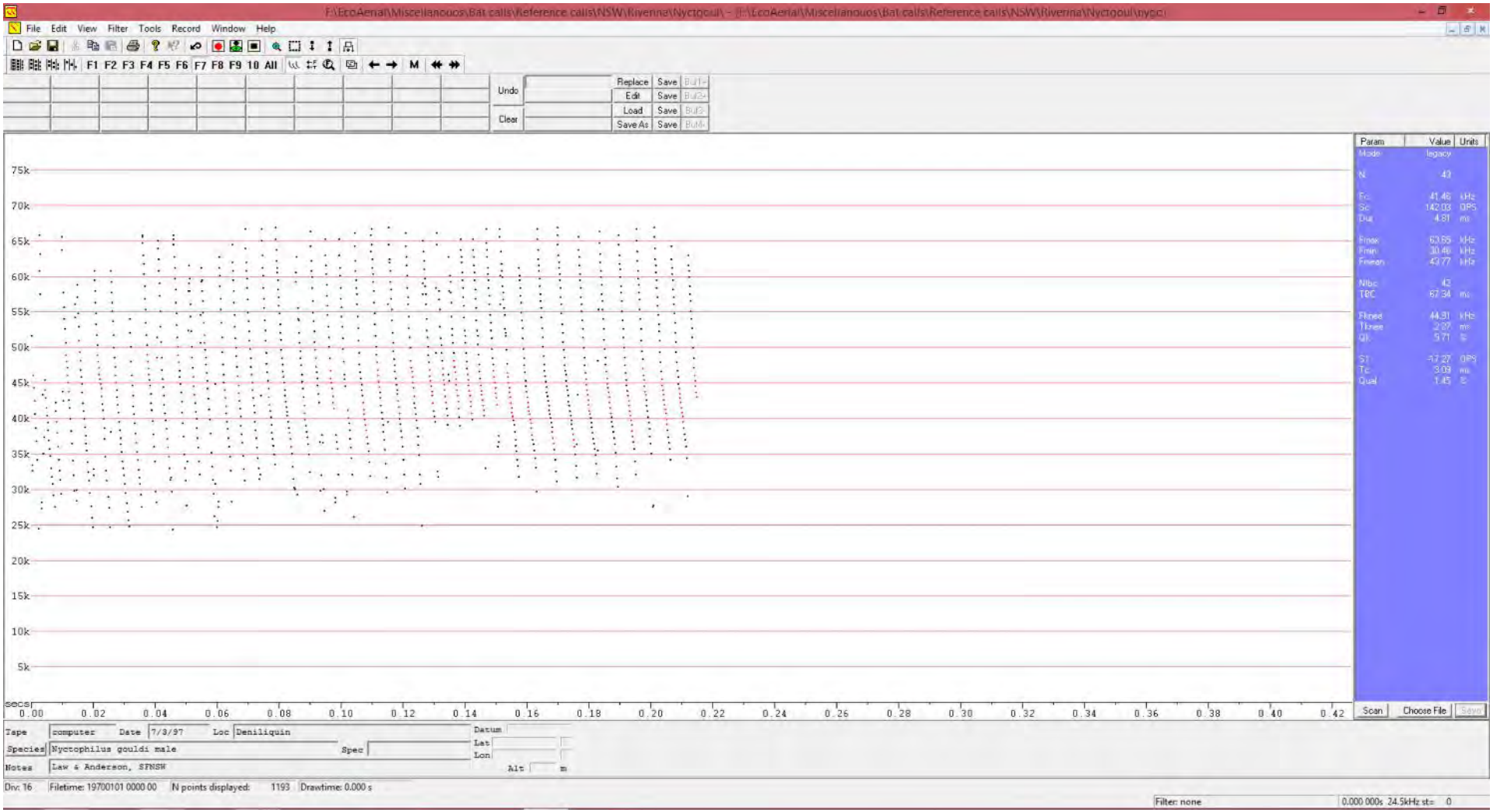

F:\EcoAerial\Miscellanouos\Bat calls\Reference calls\NSW\Riverina\Nyctgeof\ - [F:\EcoAerial\Miscellanouos\Bat calls\Reference calls\NSW\Riverina\Nyctgeof\nygel]
File Edit View Filter Tools Record Window Help
F1 F2 F3 F4 F5 F6 F7 F8 F9 10 All M
Undo
Clear
Replace Save
Edit Save
Load Save
Save As Save
Param Value Units
Mode legacy
N 42
Fc 41.99 kHz
Sc 62.22 OPS
Dur 5.00 ms
Fmax 70.56 kHz
Fmin 35.21 kHz
Fmean 49.98 kHz
Nbc 41
IBI 59.14 ms
Fknee 45.09 kHz
Tknee 3.08 ms
Qk 8.95 %
S1 12.89 OPS
Tc 4.17 ms
Qual 1.60 %
75k
70k
65k
60k
55k
50k
45k
40k
35k
30k
25k
20k
15k
10k
5k
secs
1.50 1.52 1.54 1.56 1.58 1.60 1.62 1.64 1.66 1.68 1.70 1.72 1.74 1.76 1.78 1.80 1.82 1.84 1.86 1.88 1.90
Scan
Choose File
Tape computer Date 6/3/97 Loc Deniliquin
Species Nyctophilus geoffroyi male Spec
Notes Law & Anderson, SFNSW
Datum
Lat
Lon
Alt m
Div: 16 Filetime: 19700101 0000 00 N points displayed: 1355 Drawtime: 0.016 s
Filter: none
0.000 000s 29.3kHz st= 502

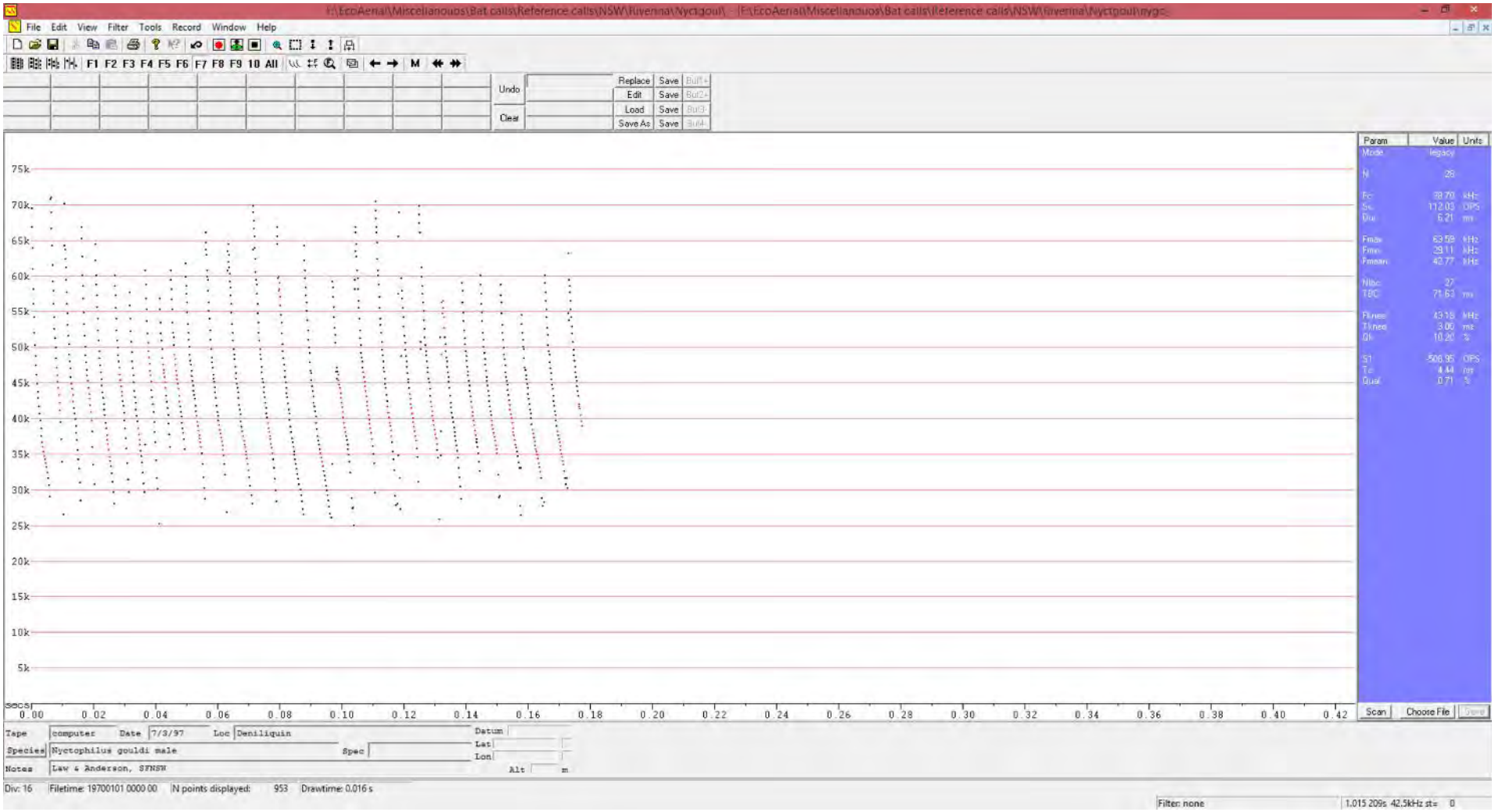
Nyctophilus gouldi

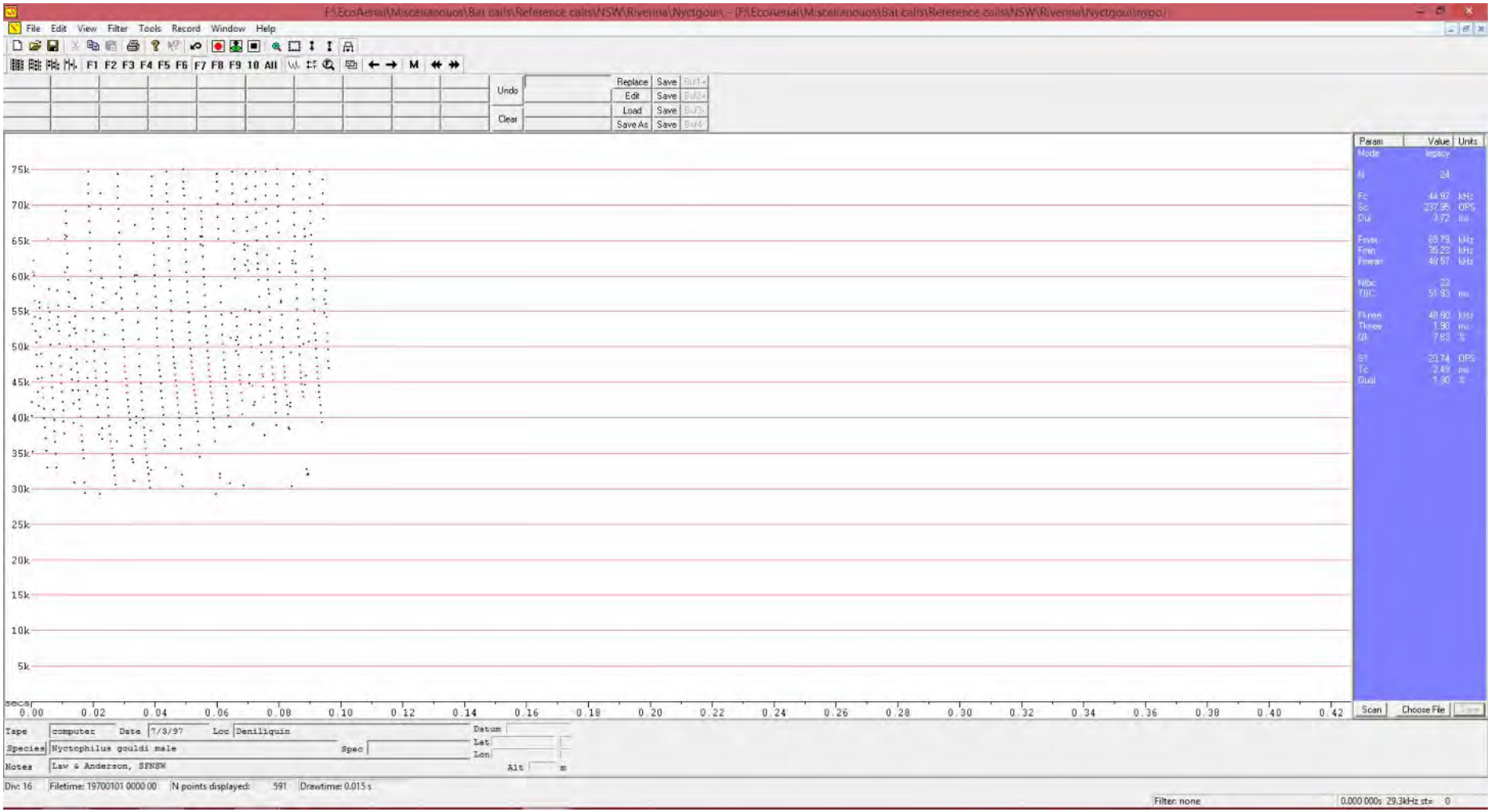
Riverina Reference Calls (Pennay et al 2002)

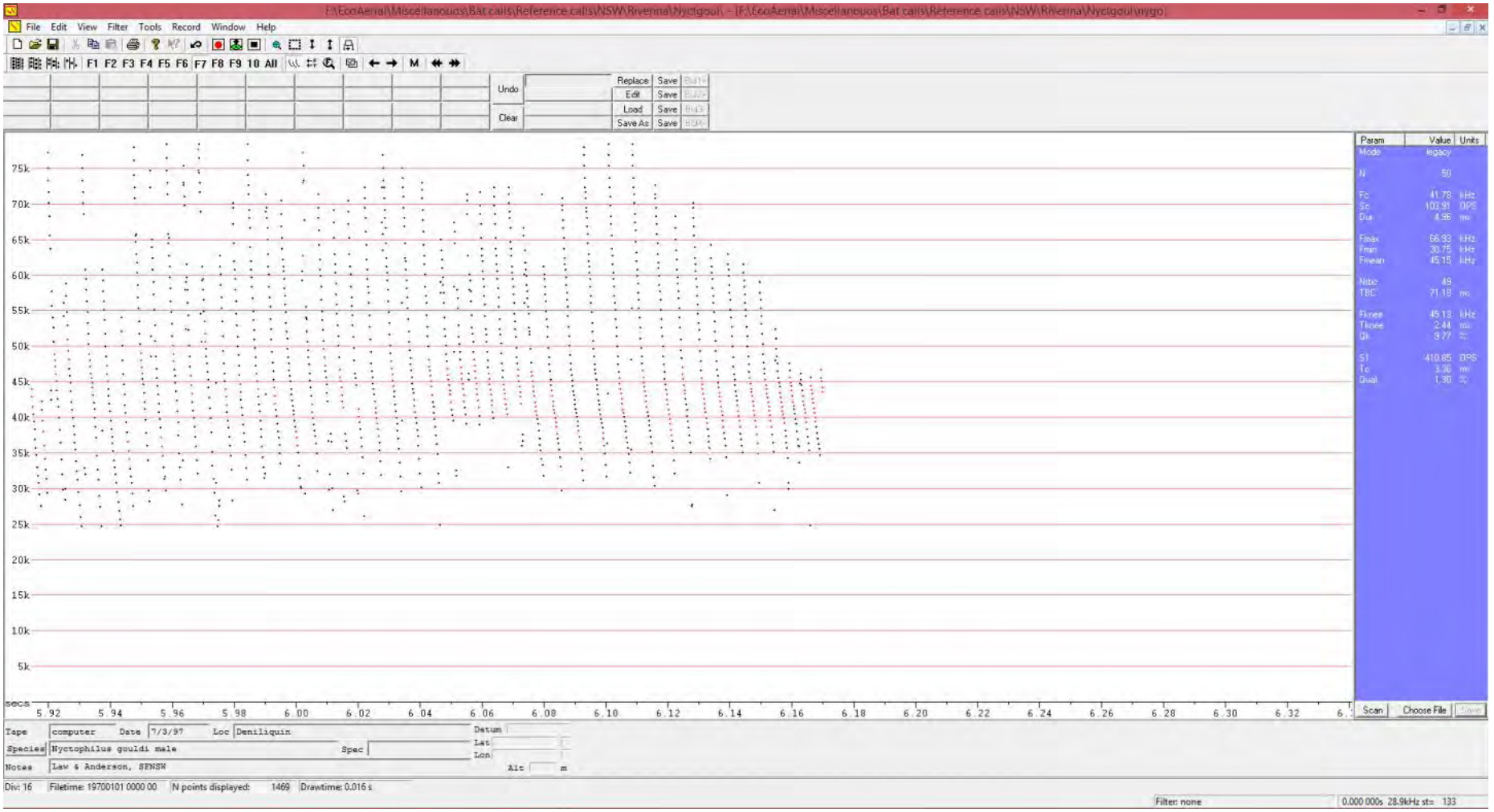

F:\EcoAerial\Miscellanous\Bat calls\Reference calls\NSW\Riverina\Nyctgoul\ - (F:\EcoAerial\Miscellanous\Bat calls\Reference calls\NSW\Riverina\Nyctgoul\nygo)
File Edit View Filter Tools Record Window Help
F1 F2 F3 F4 F5 F6 F7 F8 F9 10 All M
Undo
Clear
Replace Save
Edit Save
Load Save
Save As Save
Param Value Units
Mode legacy
N 36
Fc 38.47 kHz
Sc 106.27 DPS
Dur 5.25 ms
Fmax 61.62 kHz
Fmin 29.28 kHz
Fmean 42.44 kHz
Ntbc 35
TBC 74.86 ms
Fknee 42.96 kHz
Tknee 3.11 ms
Qk 0.07 %
S1 480.44 DPS
Tc 4.66 ms
Qual 0.68 %
75k
70k
65k
60k
55k
50k
45k
40k
35k
30k
25k
20k
15k
10k
5k
secs
0.32 0.34 0.36 0.38 0.40 0.42 0.44 0.46 0.48 0.50 0.52 0.54 0.56 0.58 0.60 0.62 0.64 0.66 0.68 0.70 0.72
Scan Choose File Save
Tape computer Date 7/3/97 Loc Deniliquin
Species Nyctophilus gouldi male Spec
Notes Law & Anderson, SFNSW
Datum
Lat
Lon
Alt m
Div: 16 Filetime: 19700101 0000 00 N points displayed: 1227 Drawtime: 0.000 s
Filter: none
0.000 000s 25.4kHz st= 347


File Edit View Filter Tools Record Window Help
F1 F2 F3 F4 F5 F6 F7 F8 F9 10 All
Undo
Clear
Replace Save
Edit Save
Load Save
Save As Save
Param Value Units
Mode legacy
N 25
Fc 44.79 kHz
Sr 250.00 DPS
Dur 3.60 ms
Fmax 68.75 kHz
Fmin 34.95 kHz
Fmean 47.84 kHz
Nbc 24
TBC 44.69 ms
Fknee 48.75 kHz
Tknee 1.76 ms
Qk 8.24 %
S1 50.84 DPS
Tc 2.36 ms
Qual 1.23 %
75k
70k
65k
60k
55k
50k
45k
40k
35k
30k
25k
20k
15k
10k
5k
secs
0.00 0.02 0.04 0.06 0.08 0.10 0.12 0.14 0.16 0.18 0.20 0.22 0.24 0.26 0.28 0.30 0.32 0.34 0.36 0.38 0.40 0.42
Scan
Choose File
Tape computer Date 7/3/97 Loc Deniliquin Datum
Species Nyctophilus gouldi male Spec Lat
Notes Law & Anderson, SFNSW Lon
Alt m
Div: 16 Filetime: 19700101 0000 00 N points displayed: 586 Drawtime: 0.000 s
Filter: none
0.000 000s 29.2kHz st= 0


F:\EcoAerial\Miscellanouos\Bat calls\Reference calls\NSW\Riverina\Nyctopul\ - F:\EcoAerial\Miscellanouos\Bat calls\Reference calls\NSW\Riverina\Nyctopul\nyctopul
File Edit View Filter Tools Record Window Help
F1 F2 F3 F4 F5 F6 F7 F8 F9 10 All M
Undo
Clear
Replace Save
Edit Save
Load Save
Save As Save
75k
70k
65k
60k
55k
50k
45k
40k
35k
30k
25k
20k
15k
10k
5k
secs
0.00 0.02 0.04 0.06 0.08 0.10 0.12 0.14 0.16 0.18 0.20 0.22 0.24 0.26 0.28 0.30 0.32 0.34 0.36 0.38 0.40 0.42
Param Value Units
Mode legacy
N 43
Fc 41.46 kHz
Sc 142.03 OPS
Dur 4.81 ms
Fmax 63.65 kHz
Fmin 30.46 kHz
Fmean 43.77 kHz
Nbc 42
TBC 67.34 ms
Fknee 44.91 kHz
Tknee 2.87 ms
QK 9.71
ST -17.27 OPS
Tc 3.09 ms
Qual 1.45
Scan Choose File Save
Tape computer Date 7/3/97 Loc Deniliquin
Species Nyctophilus gouldi male Spec
Notes Law & Anderson, SFNSW
Datum
Lat
Lon
Alt m
Div: 16 Filetime: 19700101 0000 00 N points displayed: 1193 Drawtime: 0.000 s
Filter: none
0.000 000s 24.5kHz st= 0


File Edit View Filter Tools Record Window Help
F1 F2 F3 F4 F5 F6 F7 F8 F9 10 All
Undo
Clear
Replace Save
Edit Save
Load Save
Save As Save
Param Value Units
Mode legacy
N 28
Fc 38.70 kHz
Sc 112.03 OPS
Dur 6.21 ms
Fmax 63.59 kHz
Fmin 29.11 kHz
Fmean 42.77 kHz
Nloc 27
TBC 71.63 ms
Fknee 43.15 kHz
Tknee 3.00 ms
Qk 10.26 %
S1 -508.95 OPS
Tc 4.44 ms
Qual 0.71 %
Scan Choose File Save
75k 70k 65k 60k 55k 50k 45k 40k 35k 30k 25k 20k 15k 10k 5k
secs
0.00 0.02 0.04 0.06 0.08 0.10 0.12 0.14 0.16 0.18 0.20 0.22 0.24 0.26 0.28 0.30 0.32 0.34 0.36 0.38 0.40 0.42
Tape computer Date 7/3/97 Loc Deniliquin Datum
Species Nyctophilus gouldi male Spec Lat
Notes Law & Anderson, SFNSW Lon
Alt m
Div: 16 Filetime: 19700101 0000 00 N points displayed: 953 Drawtime: 0.016 s
Filter: none
1.015 209s 42.5kHz st= 0

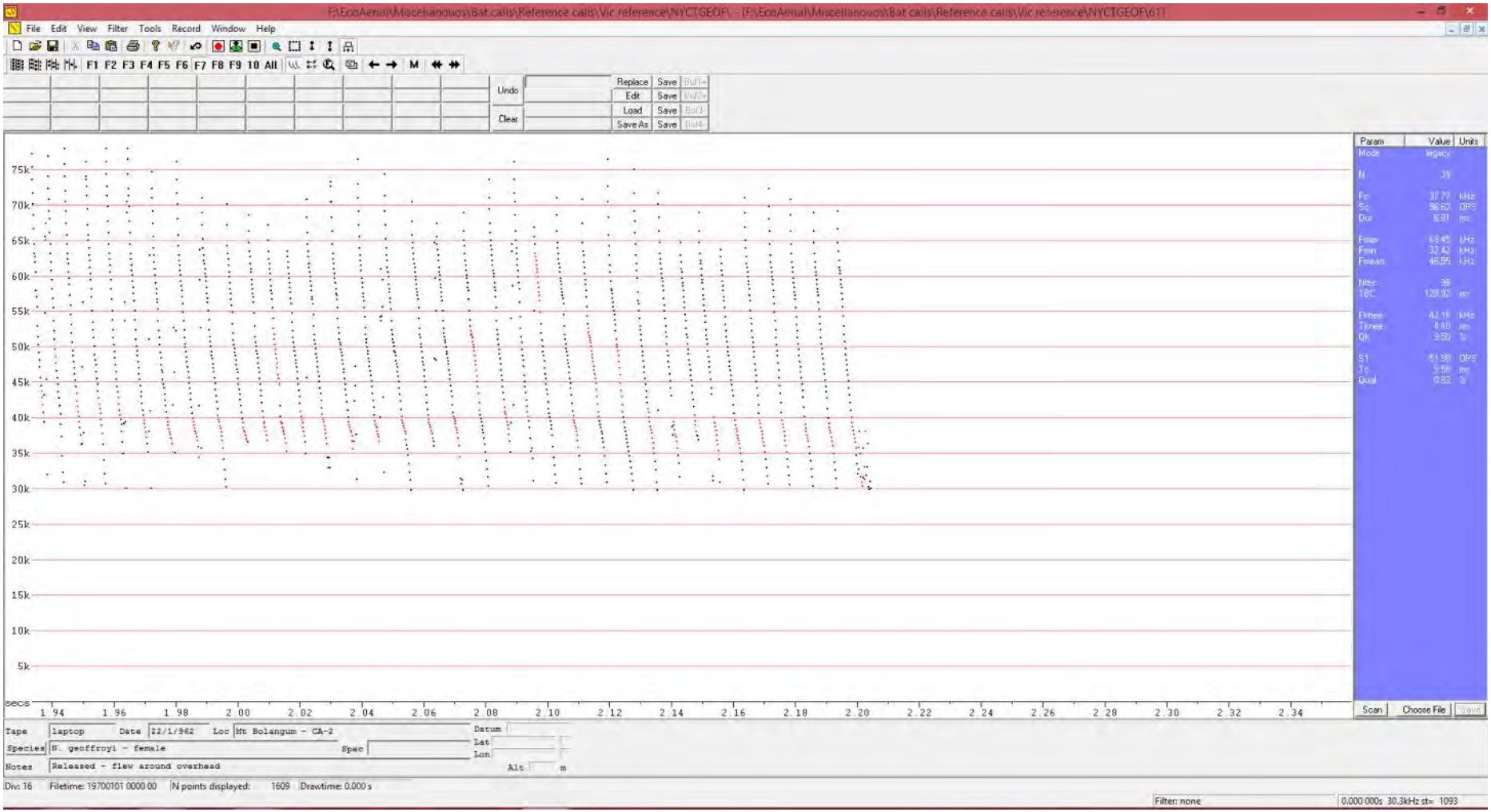

File Edit View Filter Tools Record Window Help
F1 F2 F3 F4 F5 F6 F7 F8 F9 10 All M
Undo
Clear
Replace Save
Edit Save
Load Save
Save As Save
Param Value Units
Mode legacy
N 24
Fc 44.97 kHz
Sc 237.95 DPS
Dur 3.72 ms
Fmax 49.79 kHz
Fmin 35.22 kHz
Fmean 49.57 kHz
Nbc 22
TBC 51.93 ms
Fknee 48.60 kHz
Three 1.90 ms
Qk 7.83 %
S1 23.74 DPS
Tc 2.49 ms
Qual 1.90 %
75k
70k
65k
60k
55k
50k
45k
40k
35k
30k
25k
20k
15k
10k
5k
secs
0.00 0.02 0.04 0.06 0.08 0.10 0.12 0.14 0.16 0.18 0.20 0.22 0.24 0.26 0.28 0.30 0.32 0.34 0.36 0.38 0.40 0.42
Scan
Choose File
Tape computer Date 7/3/97 Loc Deniliquin
Species Nyctophilus gouldi male Spec
Notes Law & Anderson, SFNSW
Datum
Lat
Lon
Alt m
Div: 16 Filetime: 19700101 0000 00 N points displayed: 591 Drawtime: 0.015 s
Filter: none
0.000 000s 29.3kHz st= 0

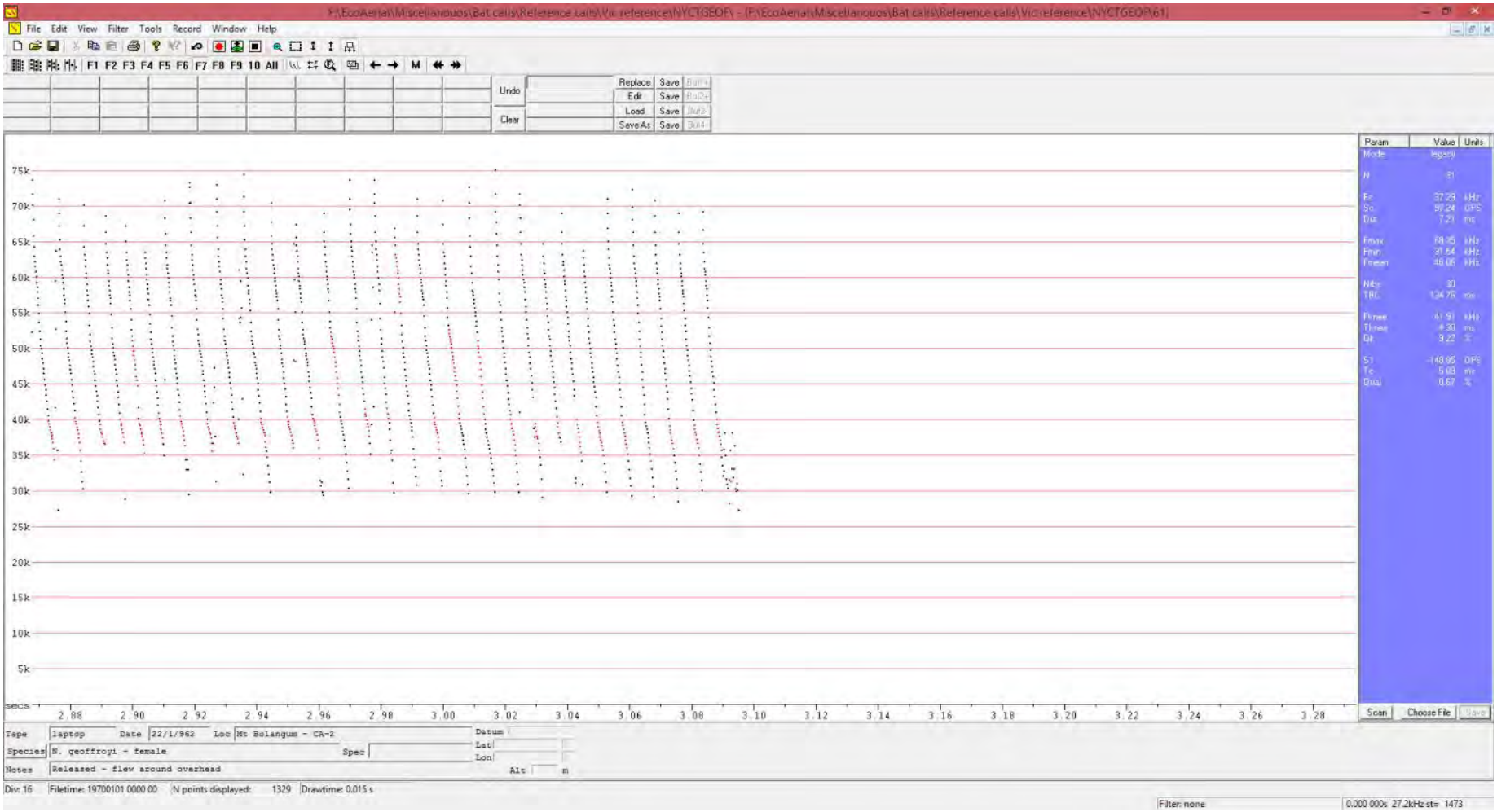

F:\EcoAerial\Miscellaneous\Bat calls\Reference calls\NSW\Riverina\Nyctgoul\ - [F:\EcoAerial\Miscellaneous\Bat calls\Reference calls\NSW\Riverina\Nyctgoul\nygo:
File Edit View Filter Tools Record Window Help
F1 F2 F3 F4 F5 F6 F7 F8 F9 10 All
Undo
Clear
Replace Save
Edit Save
Load Save
Save As Save
75k
70k
65k
60k
55k
50k
45k
40k
35k
30k
25k
20k
15k
10k
5k
secs
5.92 5.94 5.96 5.98 6.00 6.02 6.04 6.06 6.08 6.10 6.12 6.14 6.16 6.18 6.20 6.22 6.24 6.26 6.28 6.30 6.32
Param Value Units
Mode legacy
N 50
Fc 41.78 kHz
Sc 103.91 DPS
Dur 4.96 ms
Fmax 66.93 kHz
Fmin 30.75 kHz
Fmean 45.15 kHz
Nbc 49
TBC 71.19 ms
Fknee 45.13 kHz
Tknee 2.44 ms
Qk 9.77 %
S1 410.85 DPS
Tc 3.36 ms
Qual 1.30 %
Scan Choose File
Tape computer Date 7/3/97 Loc Deniliquin Datum
Species Nyctophilus gouldi male Spec Lat
Notes Law & Anderson, SENSW Lon
Alt m
Div: 16 Filetime: 19700101 0000 00 N points displayed: 1469 Drawtime: 0.016 s
Filter: none
0.000 000s 28.9kHz st= 133

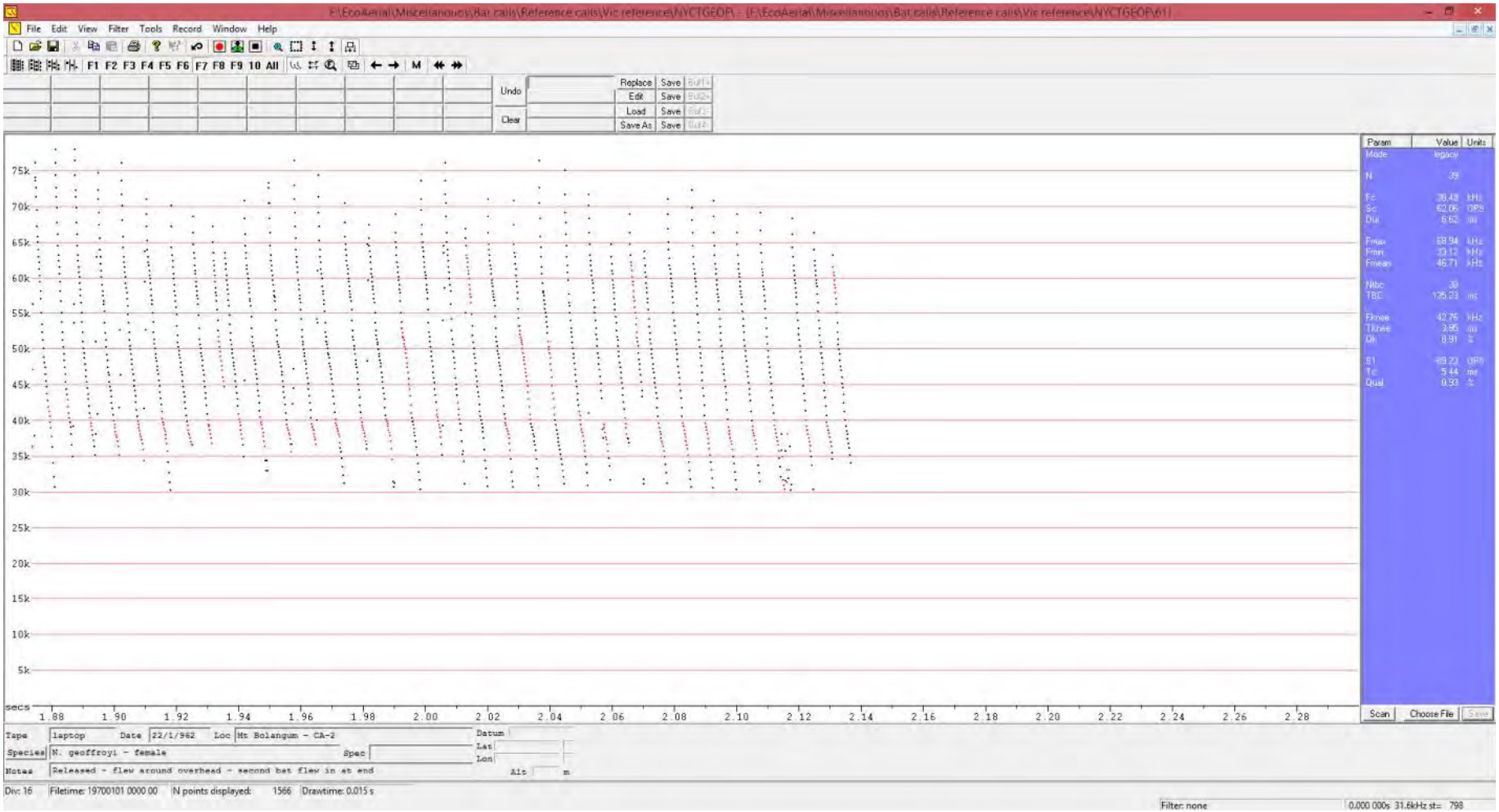
Attachment C – Nyctophilus geoffroyi and N. gouldi reference calls, Victoria and North-east Victoria

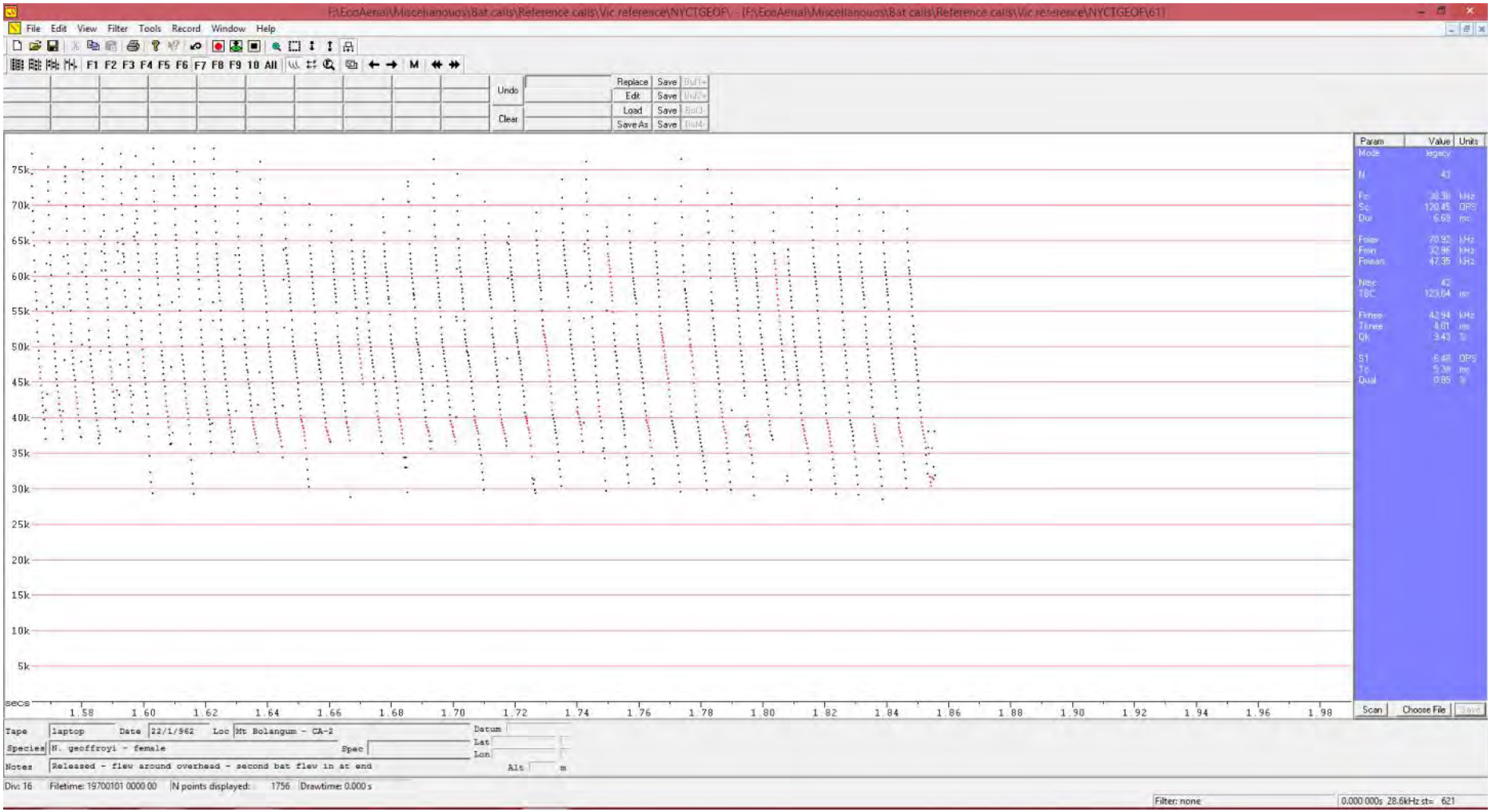
Nyctophilus geoffroyi

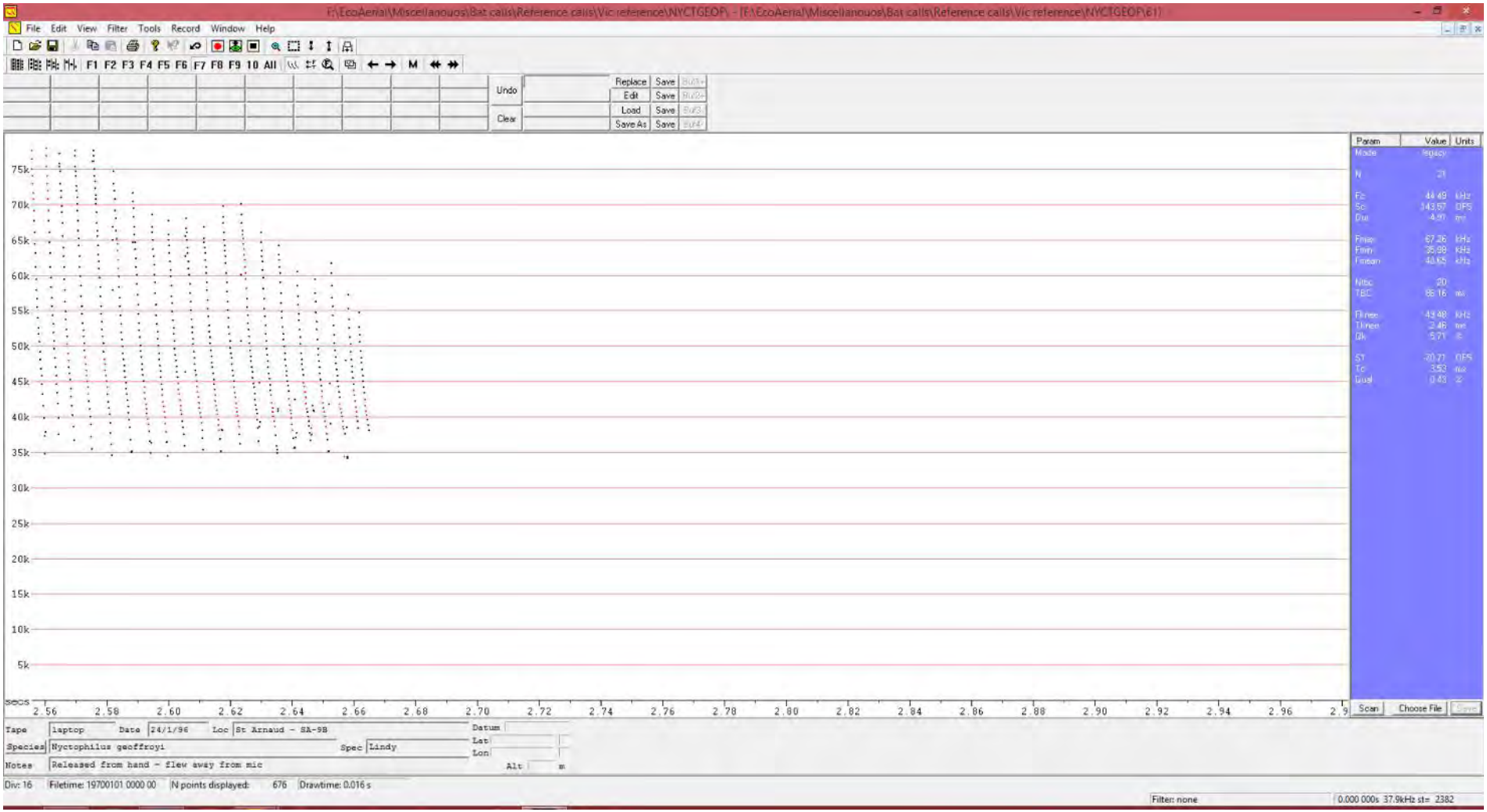
Victoria Reference Calls (Dr Lindy Lumsden)


File Edit View Filter Tools Record Window Help
F1 F2 F3 F4 F5 F6 F7 F8 F9 10 All
Undo
Clear
Replace Save
Edit Save
Load Save
Save As Save
Param Value Units
Mode legacy
N 39
Fc 37.77 kHz
Sc 96.62 DPS
Dur 6.91 ms
Fmax 69.45 kHz
Fmin 32.42 kHz
Fmean 46.55 kHz
Ntbc 38
TBC 129.92 ms
Fknee 42.19 kHz
Tknee 4.10 ms
Qk 9.50 %
S1 51.90 DPS
Tc 5.56 ms
Qual 0.82 %
75k
70k
65k
60k
55k
50k
45k
40k
35k
30k
25k
20k
15k
10k
5k
secs
1.94 1.96 1.98 2.00 2.02 2.04 2.06 2.08 2.10 2.12 2.14 2.16 2.18 2.20 2.22 2.24 2.26 2.28 2.30 2.32 2.34
Scan Choose File Save
Tape laptop Date 22/1/962 Loc Mt Bolangum - CA-2 Datum
Species N. geoffroyi - female Spec Lat Lon
Notes Released - flew around overhead Alt m
Div: 16 Filetime: 19700101 0000.00 N points displayed: 1609 Drawtime: 0.000 s
Filter: none
0.000 000s 30.3kHz st= 1093


F:\EcoAerial\Miscellanous\Bat calls\Reference calls\Vic reference\NYCTGEOF\ - [F:\EcoAerial\Miscellanous\Bat calls\Reference calls\Vic reference\NYCTGEOF\61]
File Edit View Filter Tools Record Window Help
F1 F2 F3 F4 F5 F6 F7 F8 F9 10 All M
Undo
Clear
Replace Save
Edit Save
Load Save
Save As Save
Param Value Units
Mode legacy
N 81
Fc 37.23 kHz
Sc 59.24 DPS
Dur 7.21 ms
Fmax 58.95 kHz
Fmin 31.64 kHz
Fmean 48.06 kHz
Nits 80
TBC 134.76 ms
Fknee 41.91 kHz
Tknee 4.30 ms
Qk 9.22
S1 -149.95 DPS
Tc 5.03 ms
Qual 0.67 %
75k
70k
65k
60k
55k
50k
45k
40k
35k
30k
25k
20k
15k
10k
5k
secs
2.88 2.90 2.92 2.94 2.96 2.98 3.00 3.02 3.04 3.06 3.08 3.10 3.12 3.14 3.16 3.18 3.20 3.22 3.24 3.26 3.28
Scan Choose File Save
Tape laptop Date 22/1/962 Loc Mt Bolangum - CA-2
Species N. geoffroyi - female Spec
Notes Released - flew around overhead
Datum
Lat
Lon
Alt m
Div: 16 Filetime: 19700101 0000.00 N points displayed: 1329 Drawtime: 0.015 s
Filter: none
0.000 000s 27.2kHz st= 1473

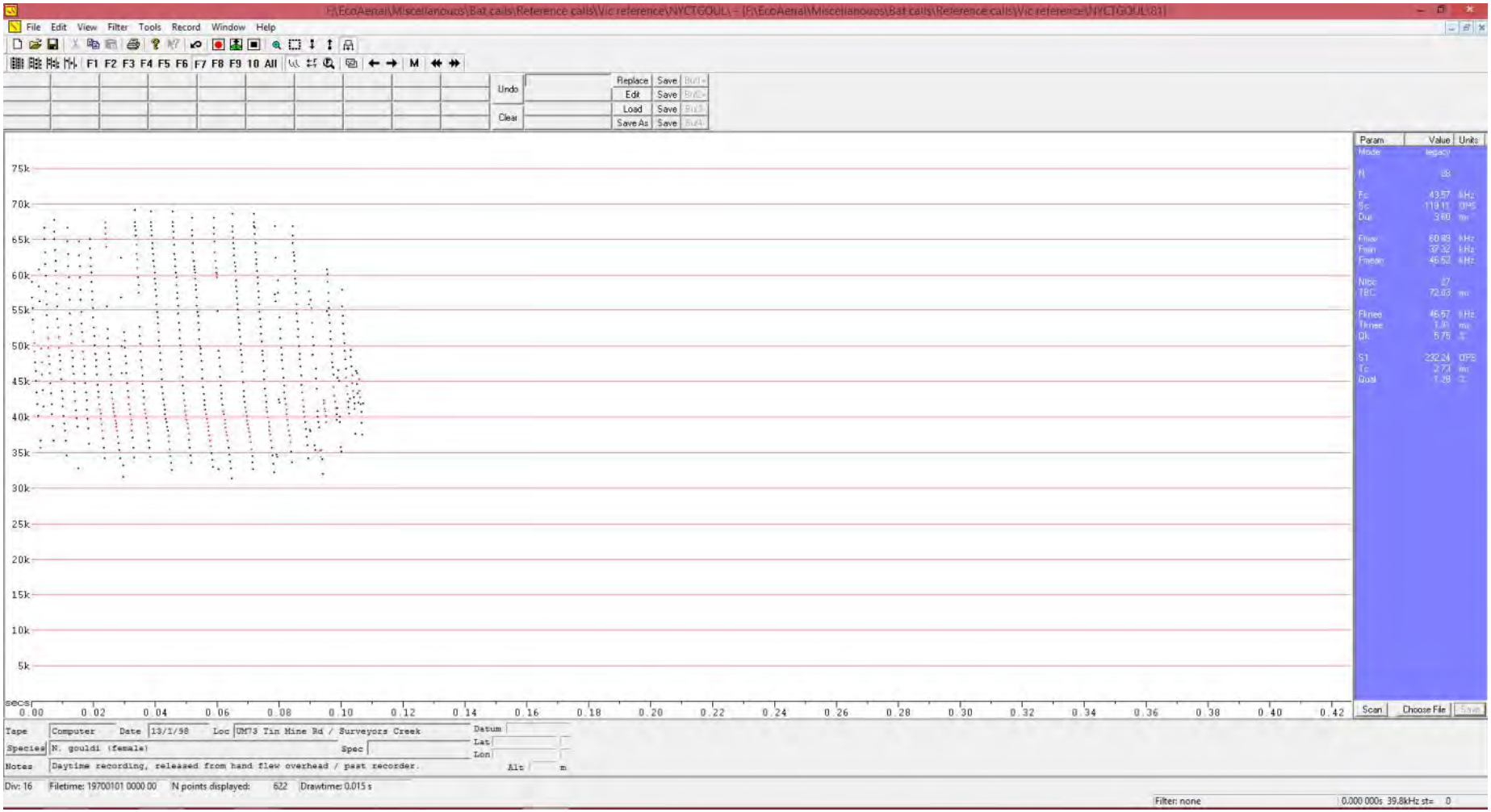

F:\EcoAerial\Miscellaneous\Bat calls\Reference calls\Vic reference\NYCTGEOF\ - [F:\EcoAerial\Miscellaneous\Bat calls\Reference calls\Vic reference\NYCTGEOF\61]
File Edit View Filter Tools Record Window Help
F1 F2 F3 F4 F5 F6 F7 F8 F9 10 All M
Undo
Clear
Replace Save
Edit Save
Load Save
Save As Save
Param Value Units
Mode legacy
N 39
Fc 39.48 kHz
Sc 62.06 OPS
Dur 6.62 ms
Fmax 88.94 kHz
Fmin 33.12 kHz
Fmean 46.71 kHz
Nibc 39
TBC 125.23 ms
Fknee 42.76 kHz
Tknee 3.95 ms
Qk 8.91 %
S1 -89.23 OPS
Tc 5.44 ms
Qual 0.93 %
75k
70k
65k
60k
55k
50k
45k
40k
35k
30k
25k
20k
15k
10k
5k
secs
1.88 1.90 1.92 1.94 1.96 1.98 2.00 2.02 2.04 2.06 2.08 2.10 2.12 2.14 2.16 2.18 2.20 2.22 2.24 2.26 2.28
Scan
Choose File
Save
Tape laptop Date 22/1/962 Loc Mt Bolangum - CA-2
Species N. geoffroyi - female Spec
Notes Released - flew around overhead - second bat flew in at end
Datum
Lat
Lon
Alt m
Div: 16 Filetime: 19700101 0000.00 N points displayed: 1566 Drawtime: 0.015 s
Filter: none
0.000 000s 31.6kHz st= 798

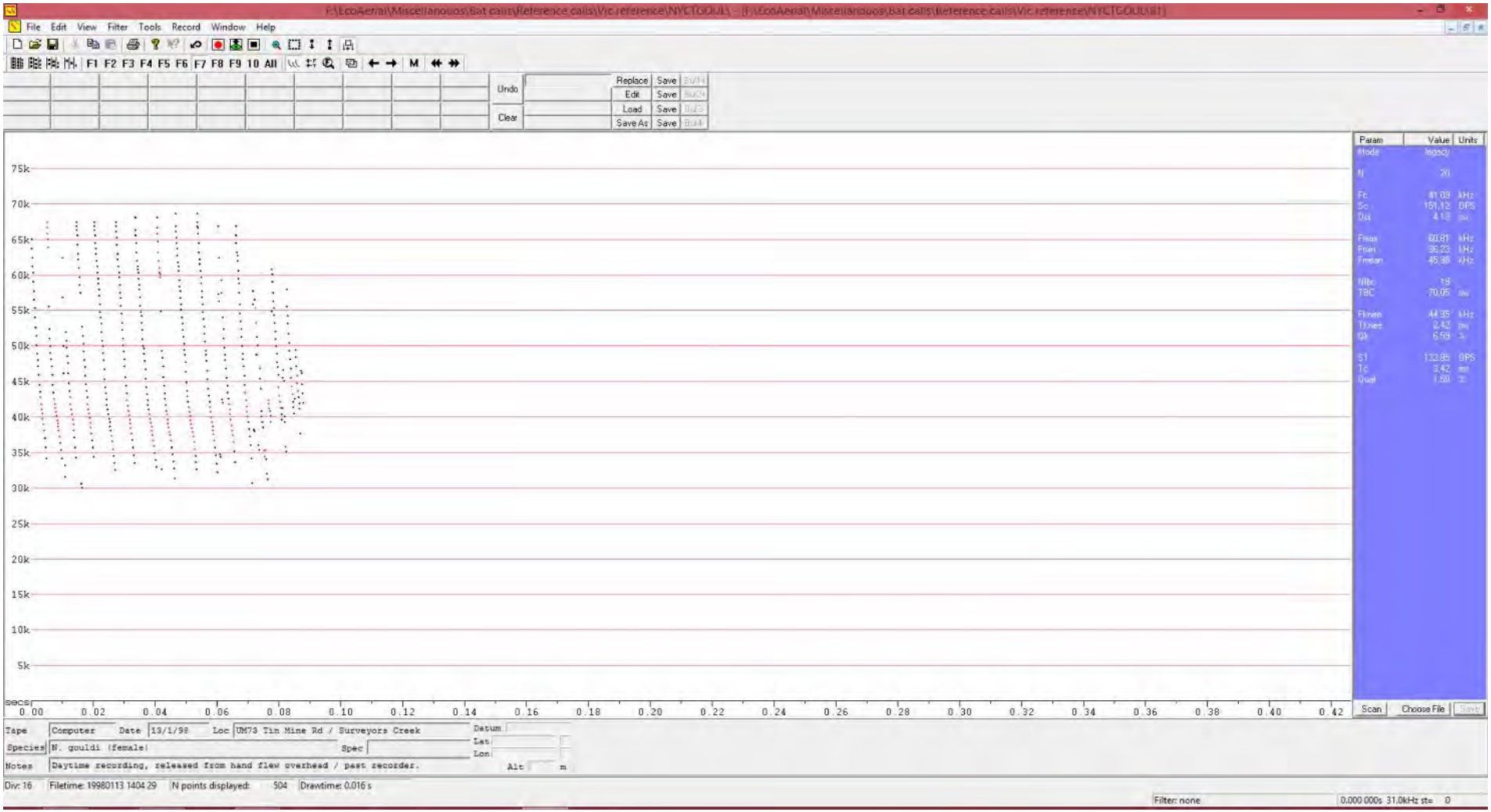

F:\EcoAerial\Miscellaneous\Bat calls\Reference calls\Vic reference\NYCTGEOF\ - [F:\EcoAerial\Miscellaneous\Bat calls\Reference calls\Vic reference\NYCTGEOF\61]
File Edit View Filter Tools Record Window Help
F1 F2 F3 F4 F5 F6 F7 F8 F9 10 All M
Undo
Clear
Replace Save
Edit Save
Load Save
Save As Save
75k
70k
65k
60k
55k
50k
45k
40k
35k
30k
25k
20k
15k
10k
5k
secs
1.58 1.60 1.62 1.64 1.66 1.68 1.70 1.72 1.74 1.76 1.78 1.80 1.82 1.84 1.86 1.88 1.90 1.92 1.94 1.96 1.98
Param Value Units
Mode legacy
N 43
Fc 36.96 kHz
Sc 120.45 DPS
Dur 6.68 ms
Fmax 70.92 kHz
Fmin 32.96 kHz
Fmean 47.35 kHz
Ntbc 42
TBC 123.64 ms
Fknee 42.94 kHz
Tknee 4.81 ms
Qk 3.43
S1 6.48 DPS
Tc 5.38 ms
Qual 0.85
Scan Choose File Save
Tape laptop Date 22/1/962 Loc Mt Bolangum - CA-2 Datum
Species N. geoffroyi - female Spec Lat Lon
Notes Released - flew around overhead - second bat flew in at end Alt m
Div: 16 Filetime: 19700101 0000.00 N points displayed: 1756 Drawtime: 0.000 s
Filter: none
0.000 000s 28.6kHz st= 621


F:\EcoAerial\Miscellanouos\Bat calls\Reference calls\Vic reference\NYCTGEOP\ - [F:\EcoAerial\Miscellanouos\Bat calls\Reference calls\Vic reference\NYCTGEOP\61]
File Edit View Filter Tools Record Window Help
F1 F2 F3 F4 F5 F6 F7 F8 F9 10 All M
Undo
Clear
Replace Save
Edit Save
Load Save
Save As Save
75k
70k
65k
60k
55k
50k
45k
40k
35k
30k
25k
20k
15k
10k
5k
secs
2.56 2.58 2.60 2.62 2.64 2.66 2.68 2.70 2.72 2.74 2.76 2.78 2.80 2.82 2.84 2.86 2.88 2.90 2.92 2.94 2.96
Param Value Units
Mode legacy
N 21
Fc 44.49 kHz
Sc 143.97 DFS
Dur 4.97 ms
Fmax 67.26 kHz
Fmin 35.99 kHz
Fmean 48.65 kHz
Nfsc 20
TBC 66.16 ms
Fknee 43.48 kHz
Tknee 2.46 ms
Qk 5.71
ST -20.77 DFS
Tc 3.52 ms
Qual 0.43
Scan Choose File Save
Tape laptop Date 24/1/96 Loc St Arnaud - SA-9B
Species Nyctophilus geoffroyi Spec Lindy
Notes Released from hand - flew away from mic
Datum
Lat
Lon
Alt m
Div: 16 Filetime: 19700101 0000 00 N points displayed: 676 Drawtime: 0.016 s
Filter: none
0.000 000s 37.9kHz st= 2382

Nyctophilus gouldi

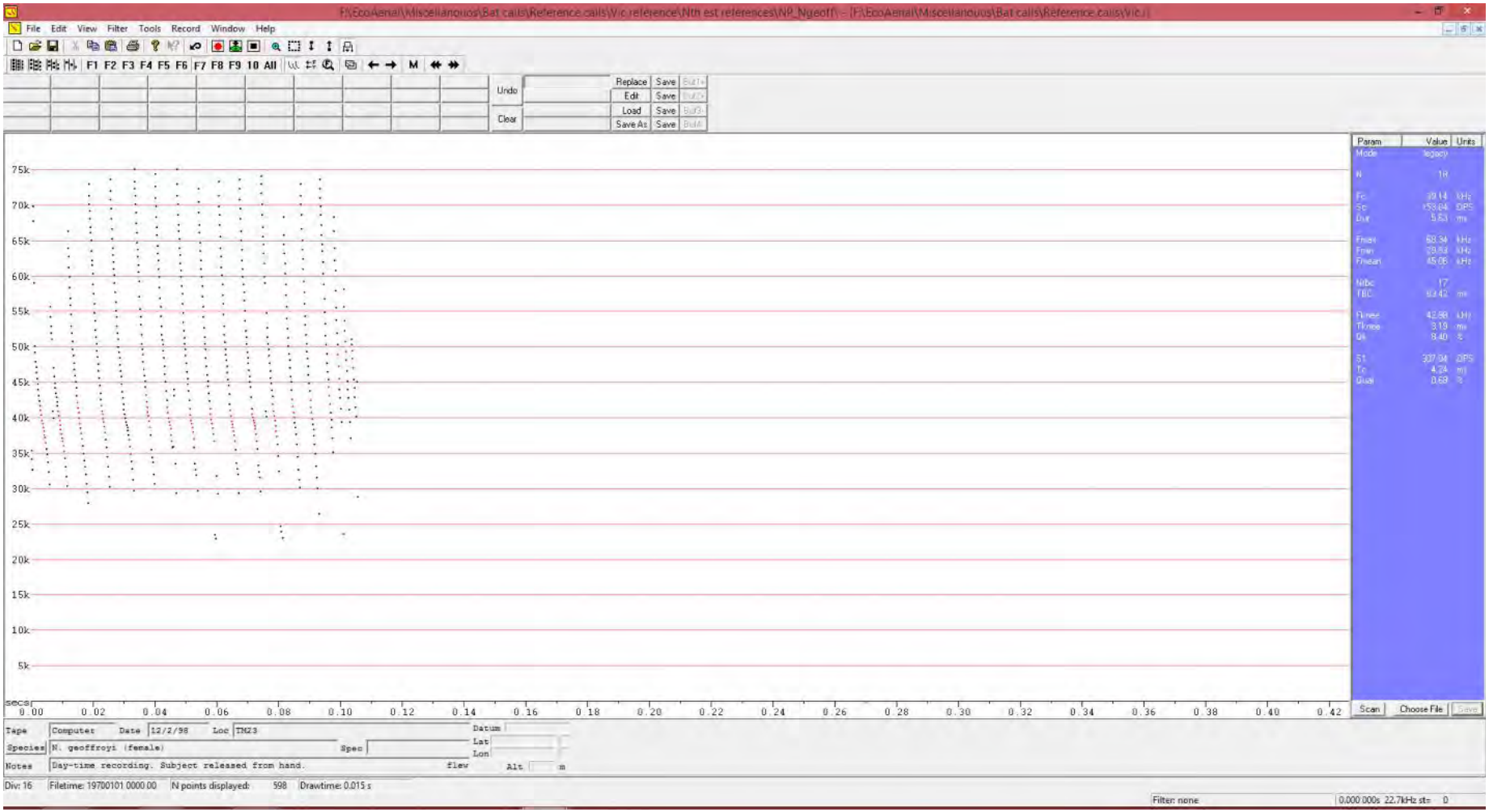
Victoria Reference Calls (Dr Lindy Lumsden)

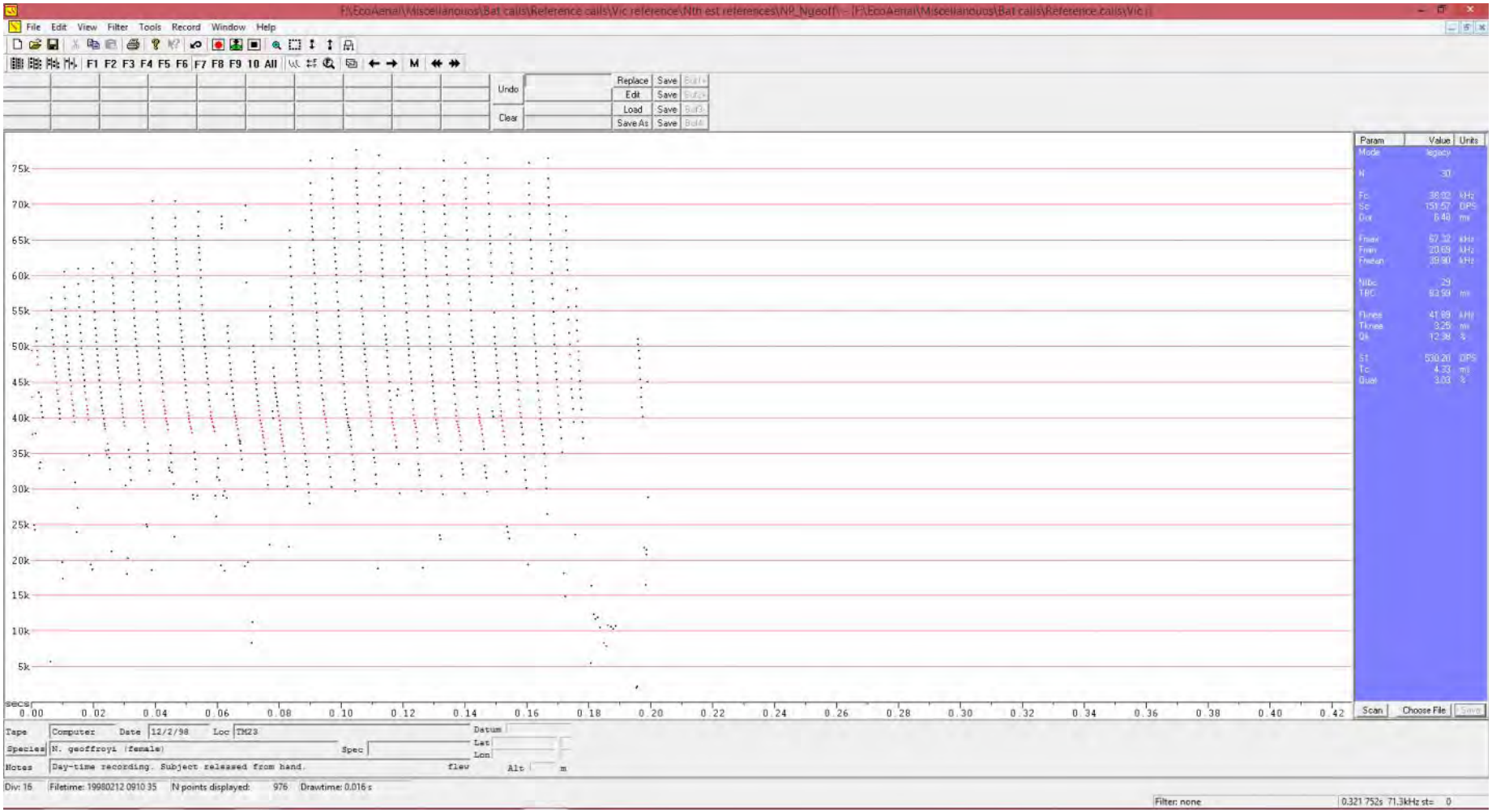

F:\EcoAerial\Miscellanouos\Bat calls\Reference calls\Vic reference\NYCTGOUL\ - [F:\EcoAerial\Miscellanouos\Bat calls\Reference calls\Vic reference\NYCTGOUL\81]
File Edit View Filter Tools Record Window Help
F1 F2 F3 F4 F5 F6 F7 F8 F9 10 All M
Undo
Clear
Replace Save
Edit Save
Load Save
Save As Save
Param Value Units
Mode legacy
Scan
Choose File
75k 70k 65k 60k 55k 50k 45k 40k 35k 30k 25k 20k 15k 10k 5k
secs
0.00 0.02 0.04 0.06 0.08 0.10 0.12 0.14 0.16 0.18 0.20 0.22 0.24 0.26 0.28 0.30 0.32 0.34 0.36 0.38 0.40 0.42
Tape Computer Date 13/1/98 Loc UM73 Tin Mine Rd / Surveyors Creek
Species N. gouldi (female) Spec
Notes Daytime recording, released from hand flew overhead / past recorder.
Datum
Lat
Lon
Alt m
Div: 16 Filetime: 19700101 0000 00 N points displayed: 622 Drawtime: 0.015 s
Filter: none
0.000 000s 39.8kHz st= 0

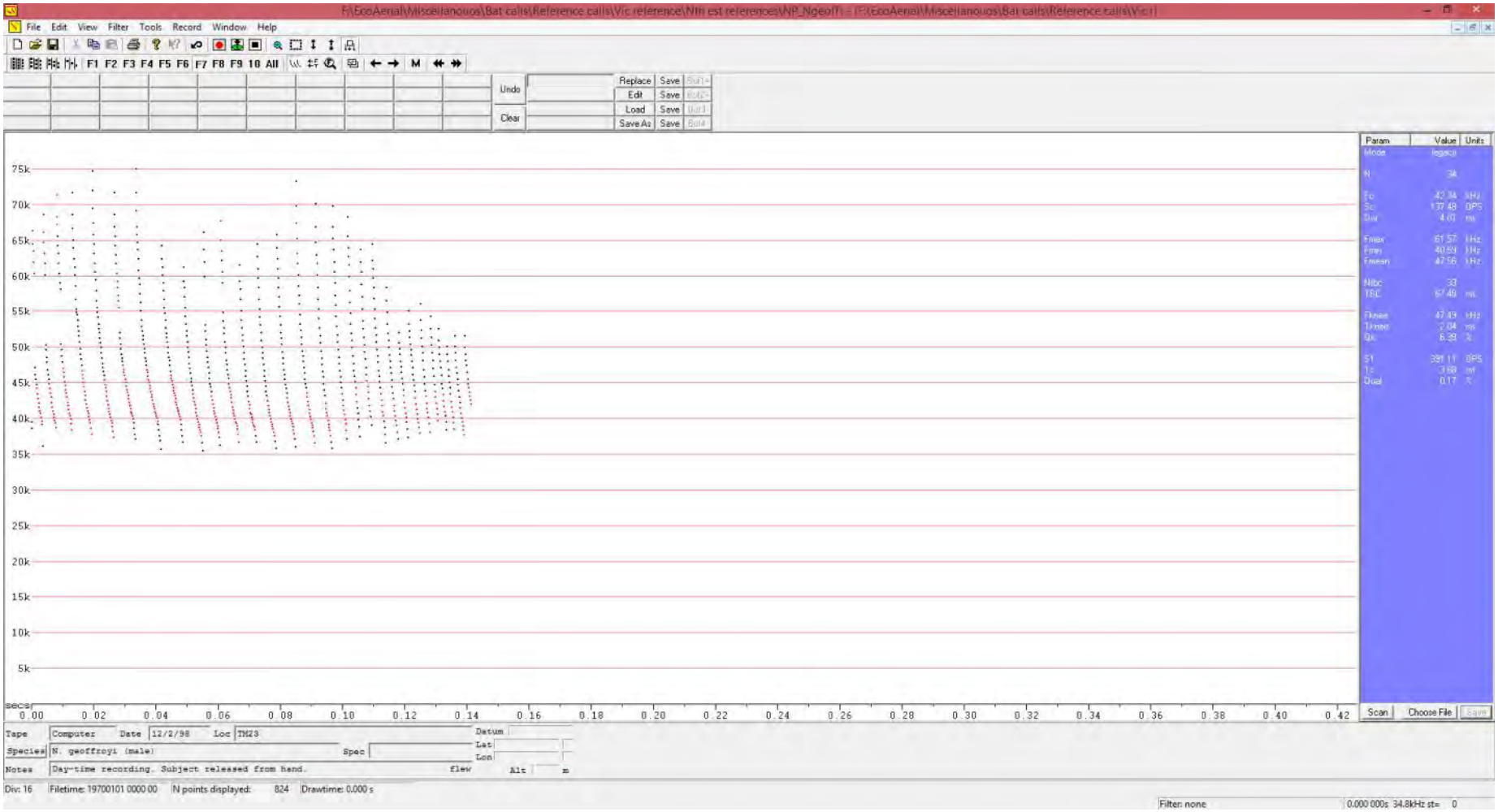

File Edit View Filter Tools Record Window Help
F1 F2 F3 F4 F5 F6 F7 F8 F9 10 All M
Undo
Clear
Replace Save
Edit Save
Load Save
Save As Save
75k
70k
65k
60k
55k
50k
45k
40k
35k
30k
25k
20k
15k
10k
5k
secs
0.00 0.02 0.04 0.06 0.08 0.10 0.12 0.14 0.16 0.18 0.20 0.22 0.24 0.26 0.28 0.30 0.32 0.34 0.36 0.38 0.40 0.42
Param Value Units
Mode legacy
N 20
Fc 41.09 kHz
Sc 151.12 DPS
Dur 4.13 ms
Fmax 60.81 kHz
Fmin 36.23 kHz
Fmean 45.89 kHz
NBc 1
TBC 70.05 ms
Fknee 44.35 kHz
Tknee 2.42 ms
Qk 6.59
S1 132.85 DPS
Tc 3.42 ms
Qual 1.50
Scan Choose File Save
Tape Computer Date 13/1/98 Loc UM73 Tin Mine Rd / Surveyors Creek
Species N. gouldi (female) Spec
Notes Daytime recording, released from hand flew overhead / past recorder.
Datum
Lat
Lon
Alt m
Div: 16 Filetime: 19980113 1404 29 N points displayed: 504 Drawtime: 0.016 s
Filter: none
0.000 000s 31.0kHz str 0

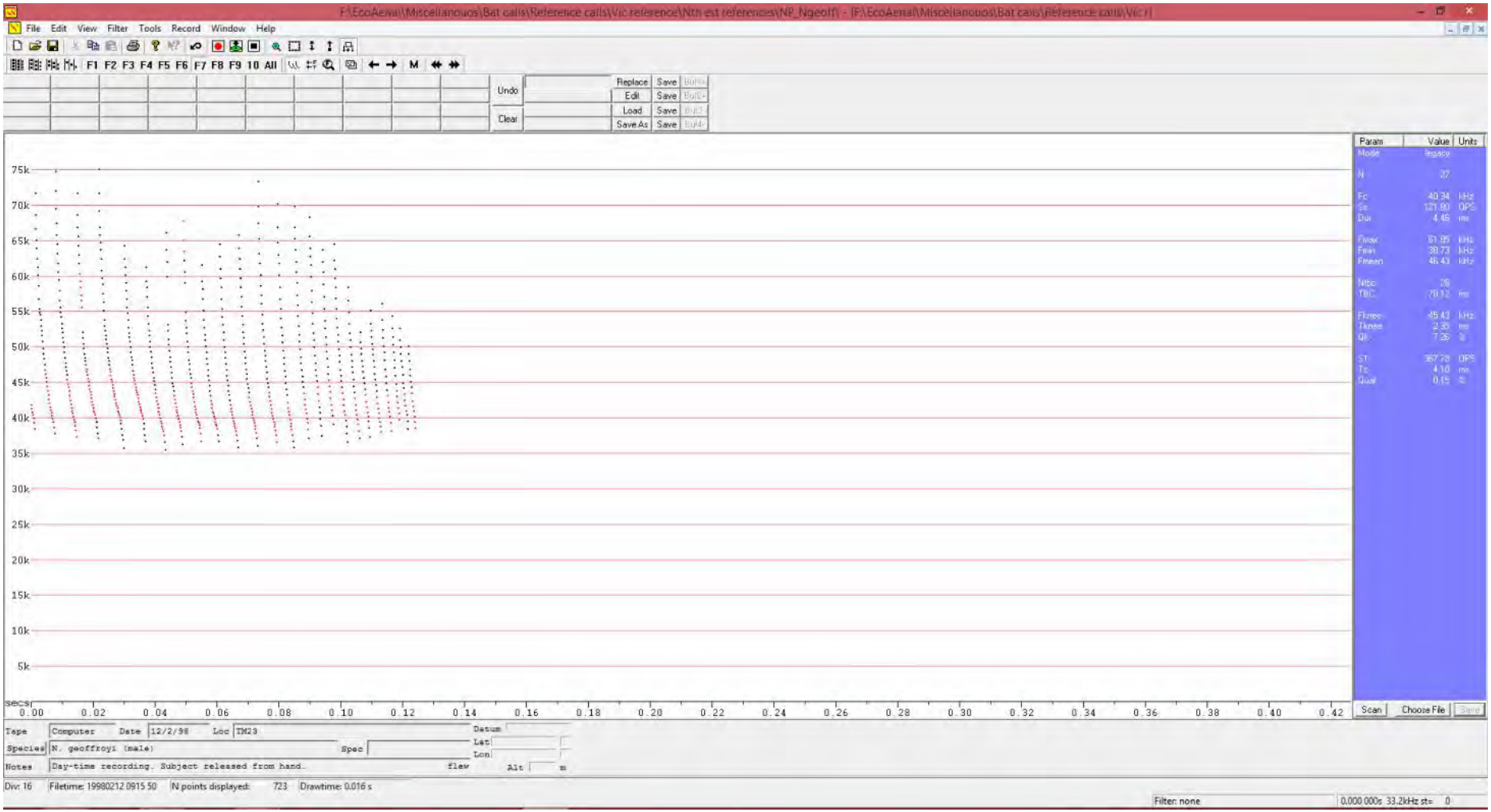
Nyctophilus geoffroyi

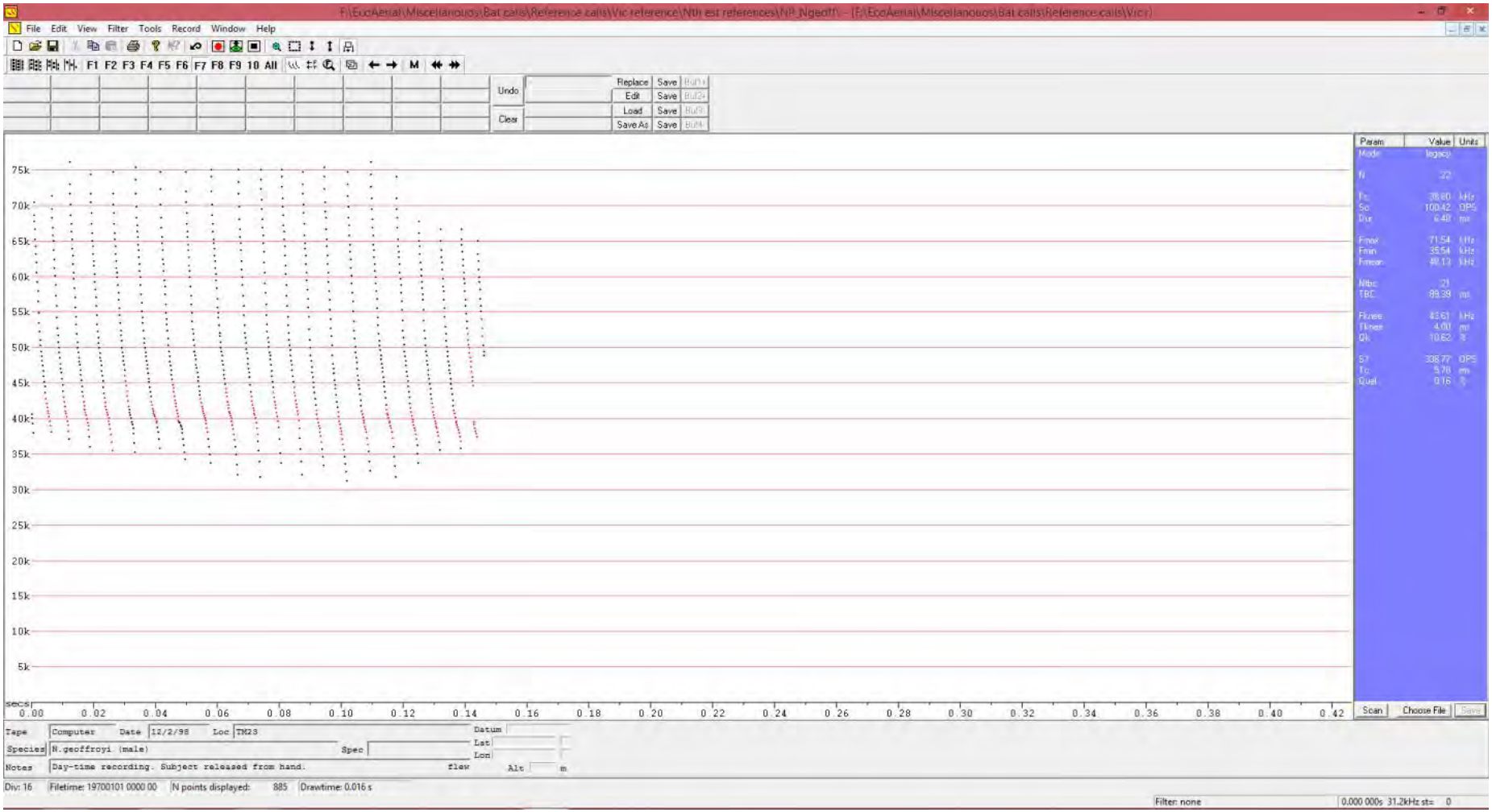
North-east Victoria Reference calls (Dr Lindy Lumsden)

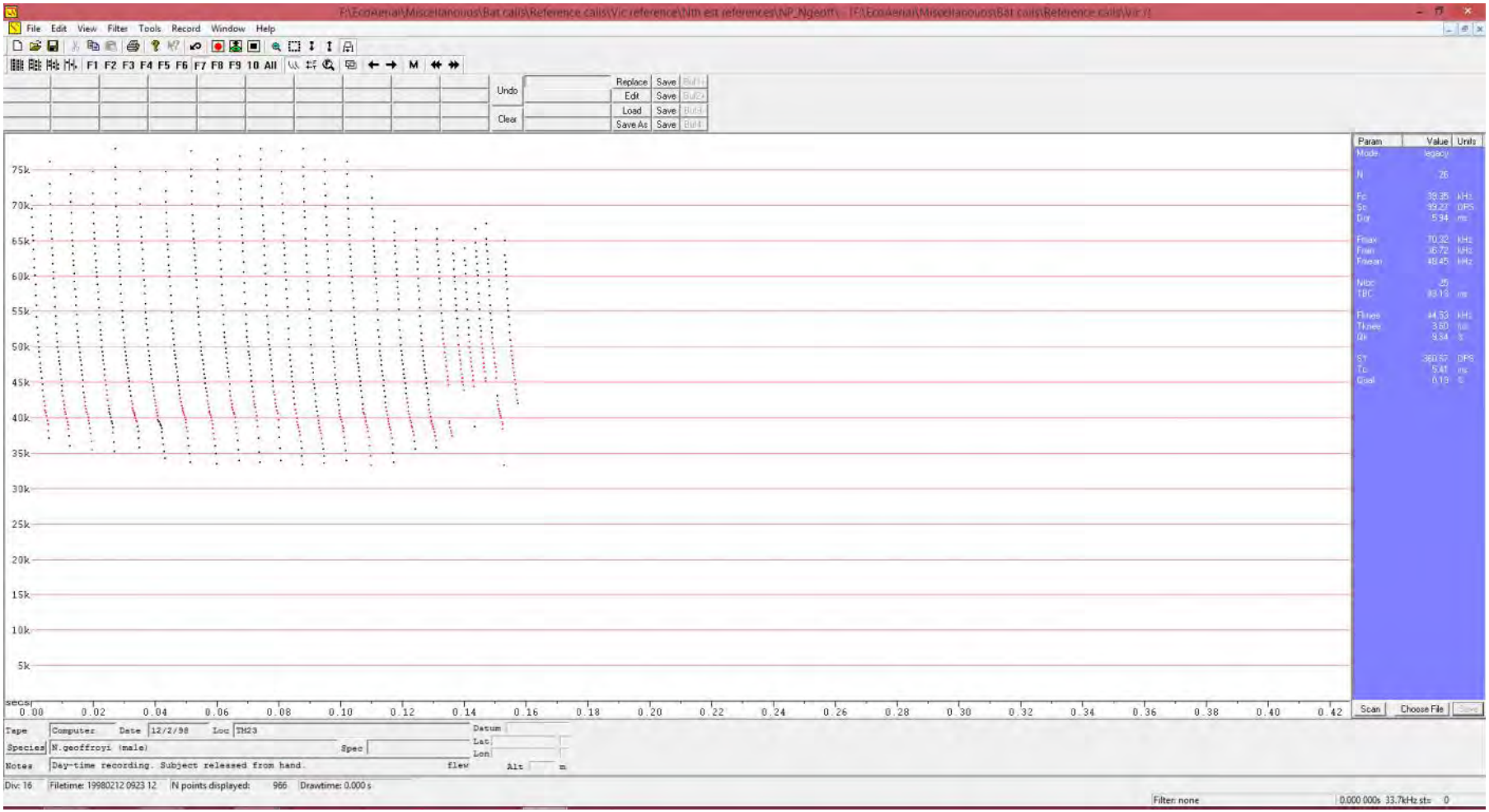

File Edit View Filter Tools Record Window Help
F1 F2 F3 F4 F5 F6 F7 F8 F9 10 All M
Undo
Clear
Replace Save
Edit Save
Load Save
Save As Save
Param Value Units
Mode legacy
N 18
Scan Choose File Save
75k 70k 65k 60k 55k 50k 45k 40k 35k 30k 25k 20k 15k 10k 5k
secs
0.00 0.02 0.04 0.06 0.08 0.10 0.12 0.14 0.16 0.18 0.20 0.22 0.24 0.26 0.28 0.30 0.32 0.34 0.36 0.38 0.40 0.42
Tape Computer Date 12/2/98 Loc TM23
Species N. geoffroyi (female)
Notes Day-time recording. Subject released from hand.
Datum
Lat
Lon
Alt m
Div: 16 Filetime: 19700101 0000.00 N points displayed: 598 Drawtime: 0.015 s
Filter: none
0.000 000s 22.7kHz st= 0

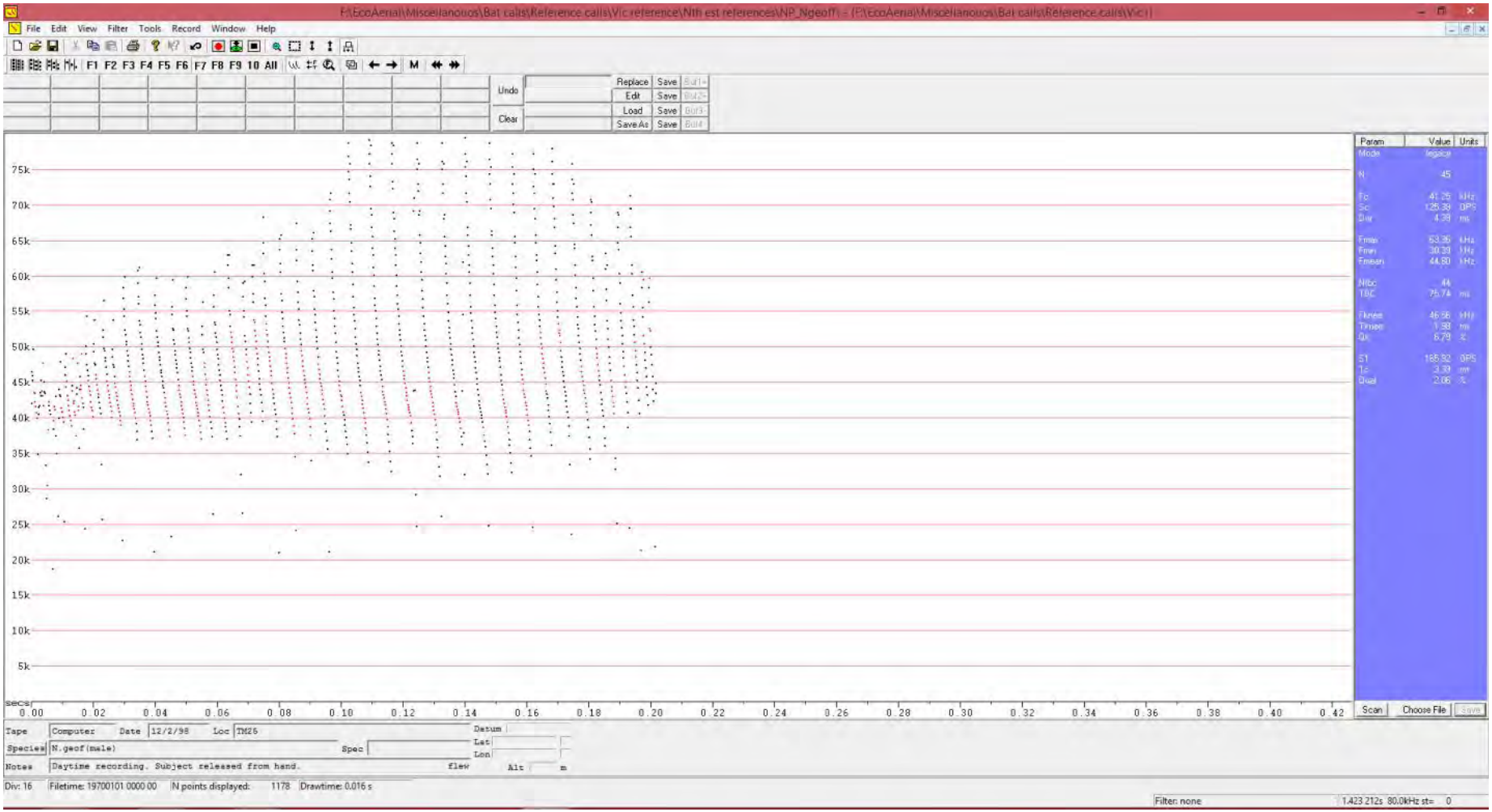

F:\EcoAerial\Miscellanous\Bat calls\Reference calls\Vic reference\Nth est references\NP_Ngeoff\ - [F:\EcoAerial\Miscellanous\Bat calls\Reference calls\Vic]
File Edit View Filter Tools Record Window Help
F1 F2 F3 F4 F5 F6 F7 F8 F9 10 All
Undo
Clear
Replace Save
Edit Save
Load Save
Save As Save
75k
70k
65k
60k
55k
50k
45k
40k
35k
30k
25k
20k
15k
10k
5k
secs
0.00 0.02 0.04 0.06 0.08 0.10 0.12 0.14 0.16 0.18 0.20 0.22 0.24 0.26 0.28 0.30 0.32 0.34 0.36 0.38 0.40 0.42
Param Value Units
Mode legacy
N 30
Fc 38.02 kHz
Sc 151.57 DPS
Dur 6.48 ms
Fmax 67.32 kHz
Fmin 20.69 kHz
Fmean 39.90 kHz
NBc 29
TBC 83.99 ms
Fknee 41.89 kHz
Tknee 3.25 ms
Qk 12.38 %
S1 530.20 DPS
Tc 4.33 ms
Qual 3.03 %
Scan Choose File Save
Tape Computer Date 12/2/98 Loc TM23 Datum
Species N. geoffroyi (female) Spec Lat
Lon
Notes Day-time recording. Subject released from hand. flew Alt m
Div: 16 Filetime: 19980212 0910 35 N points displayed: 976 Drawtime: 0.016 s
Filter: none
0.321 752s 71.3kHz st= 0

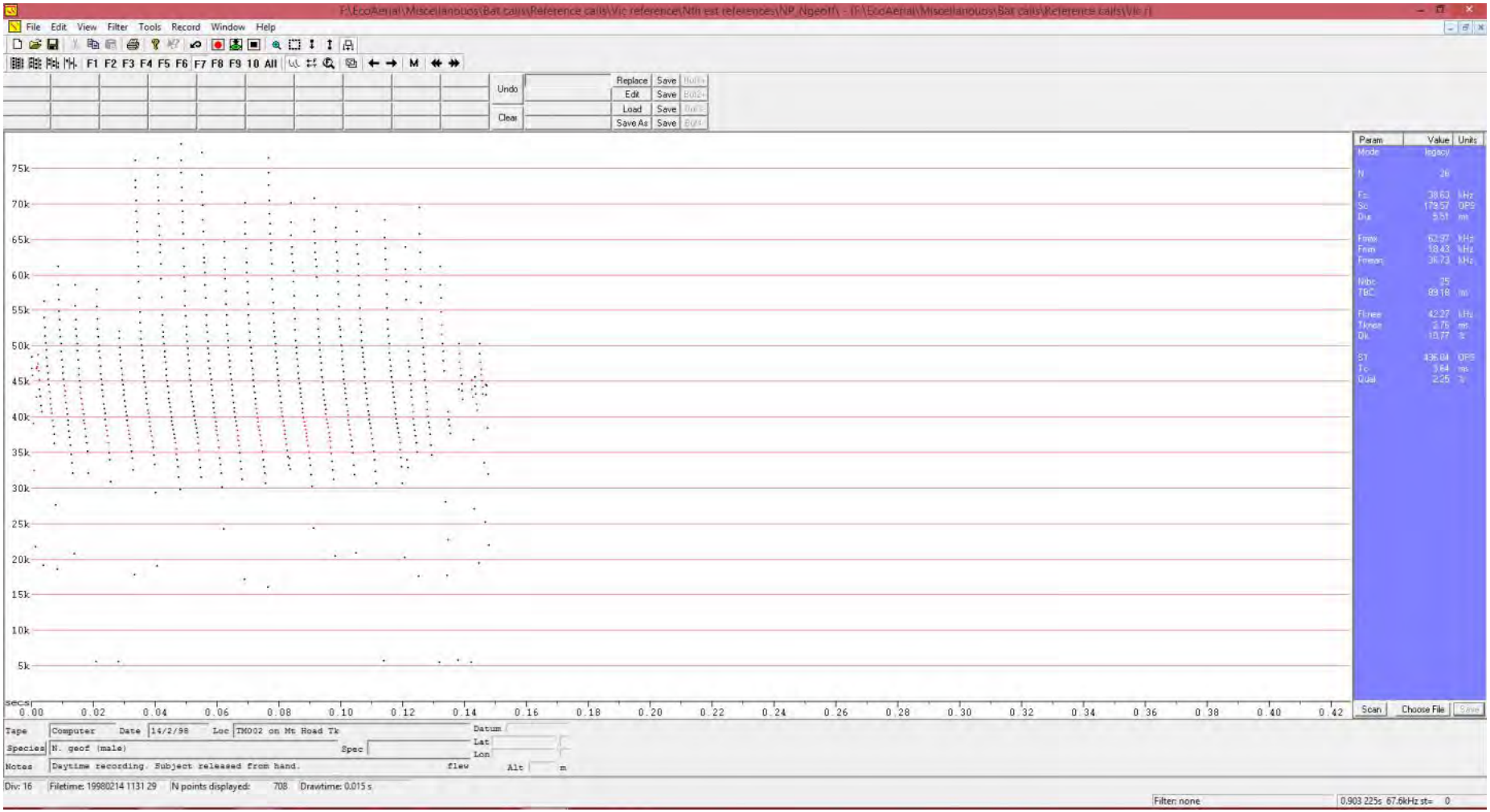

File Edit View Filter Tools Record Window Help
F1 F2 F3 F4 F5 F6 F7 F8 F9 10 All
Undo
Clear
Replace Save
Edit Save
Load Save
Save As Save
75k
70k
65k
60k
55k
50k
45k
40k
35k
30k
25k
20k
15k
10k
5k
secs
0.00 0.02 0.04 0.06 0.08 0.10 0.12 0.14 0.16 0.18 0.20 0.22 0.24 0.26 0.28 0.30 0.32 0.34 0.36 0.38 0.40 0.42
Param Value Units
Mode legacy
N 34
Fc 42.34 kHz
Sc 137.48 DPS
Dur 4.01 ms
Fmax 61.57 kHz
Fmin 40.59 kHz
Fmean 47.56 kHz
Nlbc 33
TBC 67.49 ms
Fknee 47.49 kHz
Tknee 2.04 ms
Qk 6.39 %
S1 391.11 DPS
Tc 3.69 mf
Qual 0.17 %
Scan Choose File Save
Tape Computer Date 12/2/98 Loc TM23
Species N. geoffroyi (male) Spec
Notes Day-time recording. Subject released from hand. flew
Datum
Lat
Lon
Alt m
Div: 16 Filetime: 19700101 0000 00 N points displayed: 824 Drawtime: 0.000 s
Filter: none
0.000 000s 34.8kHz st= 0

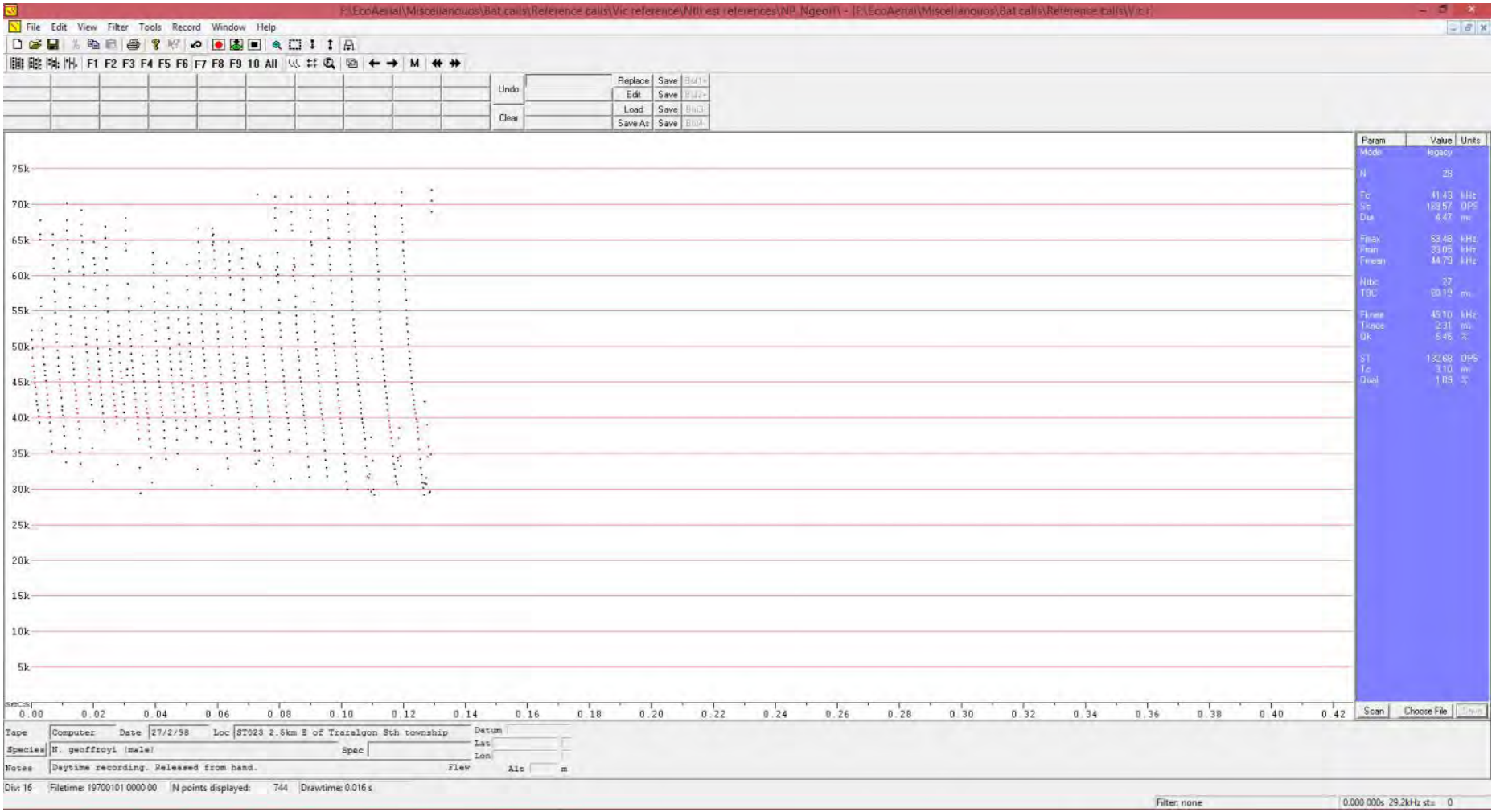

File Edit View Filter Tools Record Window Help
F1 F2 F3 F4 F5 F6 F7 F8 F9 10 All M
Undo
Clear
Replace Save
Edit Save
Load Save
Save As Save
Param Value Units
Mode legacy
N 37
Fc 40.34 kHz
Sr 121.80 OPS
Dur 4.46 ms
Fmax 51.95 kHz
Fmin 38.73 kHz
Fmean 46.43 kHz
NBc 26
TBC 79.12 ms
Fknee 45.43 kHz
Tknee 2.35 ms
Qf 7.26
ST 367.78 OPS
Tc 4.10 ms
Qual 0.15
75k 70k 65k 60k 55k 50k 45k 40k 35k 30k 25k 20k 15k 10k 5k
secs
0.00 0.02 0.04 0.06 0.08 0.10 0.12 0.14 0.16 0.18 0.20 0.22 0.24 0.26 0.28 0.30 0.32 0.34 0.36 0.38 0.40 0.42
Scan Choose File
Tape Computer Date 12/2/98 Loc TM23 Datum
Species N. geoffroyi (male) Spec Lat Lon
Notes Day-time recording. Subject released from hand. flew Alt m
Div: 16 Filetime: 19980212 0915 50 N points displayed: 723 Drawtime: 0.016 s
Filter: none 0.000 000s 33.2kHz st= 0

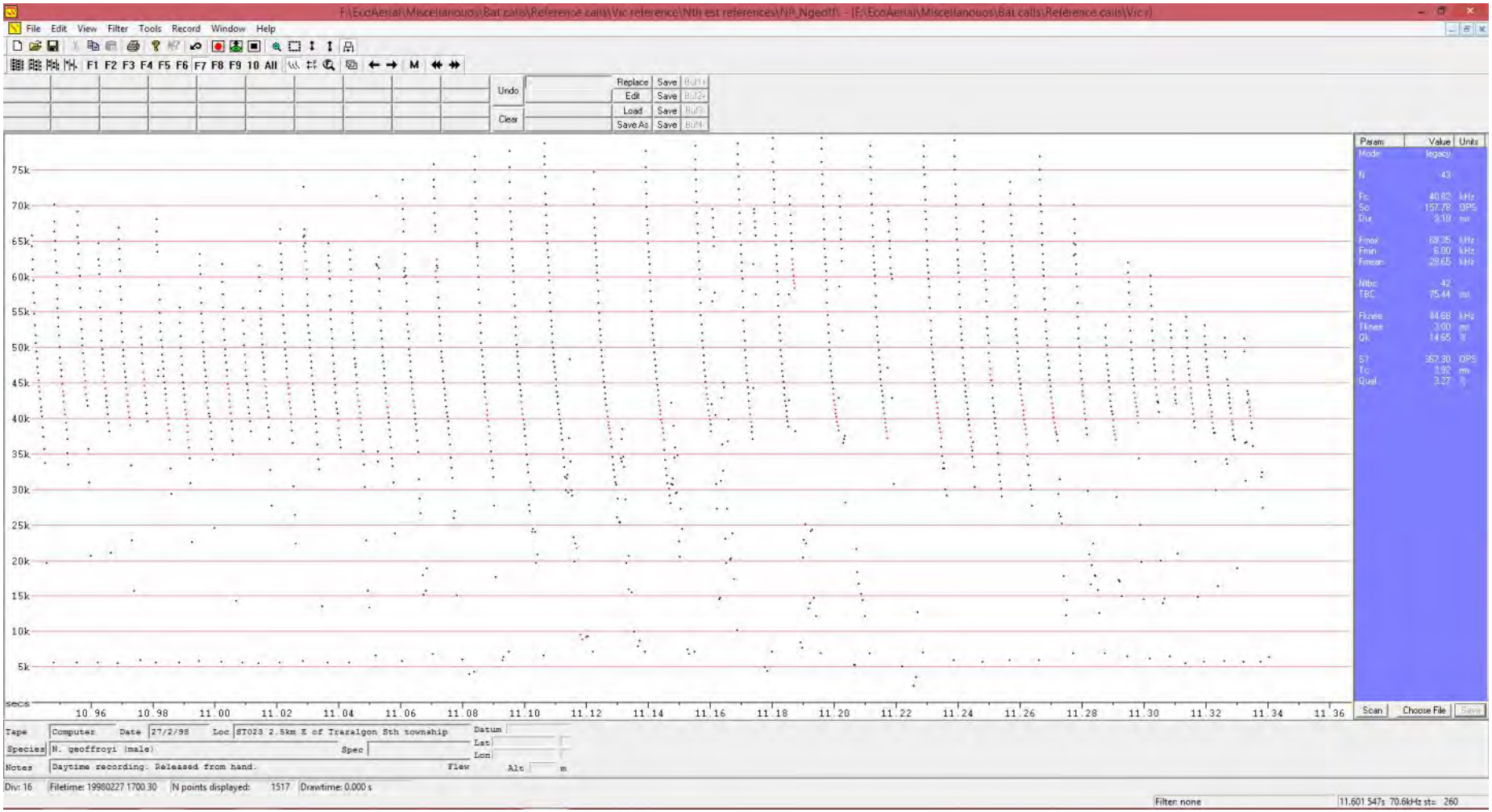

F:\EcoAerial\Miscellaneous\Bat calls\Reference calls\Vic reference\Nth est references\N.Ngeoff\ - [F:\EcoAerial\Miscellaneous\Bat calls\Reference calls\Vic r
File Edit View Filter Tools Record Window Help
F1 F2 F3 F4 F5 F6 F7 F8 F9 10 All M
Undo
Clear
Replace Save
Edit Save
Load Save
Save As Save
75k
70k
65k
60k
55k
50k
45k
40k
35k
30k
25k
20k
15k
10k
5k
secs
0.00 0.02 0.04 0.06 0.08 0.10 0.12 0.14 0.16 0.18 0.20 0.22 0.24 0.26 0.28 0.30 0.32 0.34 0.36 0.38 0.40 0.42
Param Value Units
Mode legacy
N 22
Fc 38.60 kHz
Sc 100.42 DPS
Dur 6.40 ms
Fmax 71.54 kHz
Fmin 35.54 kHz
Fmean 49.13 kHz
Nfbc 21
TBC 89.39 ms
Fknee 43.61 kHz
Fknee 4.00 ms
Qk 10.62 %
S? 338.77 DPS
Tc 5.76 ms
Qual 0.16 %
Scan Choose File Save
Tape Computer Date 12/2/98 Loc TM23 Datum
Species N.geoffroyi (male) Spec Lat
Notes Day-time recording. Subject released from hand. flew Lon Alt m
Div: 16 Filetime: 19700101 0000 00 N points displayed: 885 Drawtime: 0.016 s
Filter: none 0.000 000s 31.2kHz st= 0

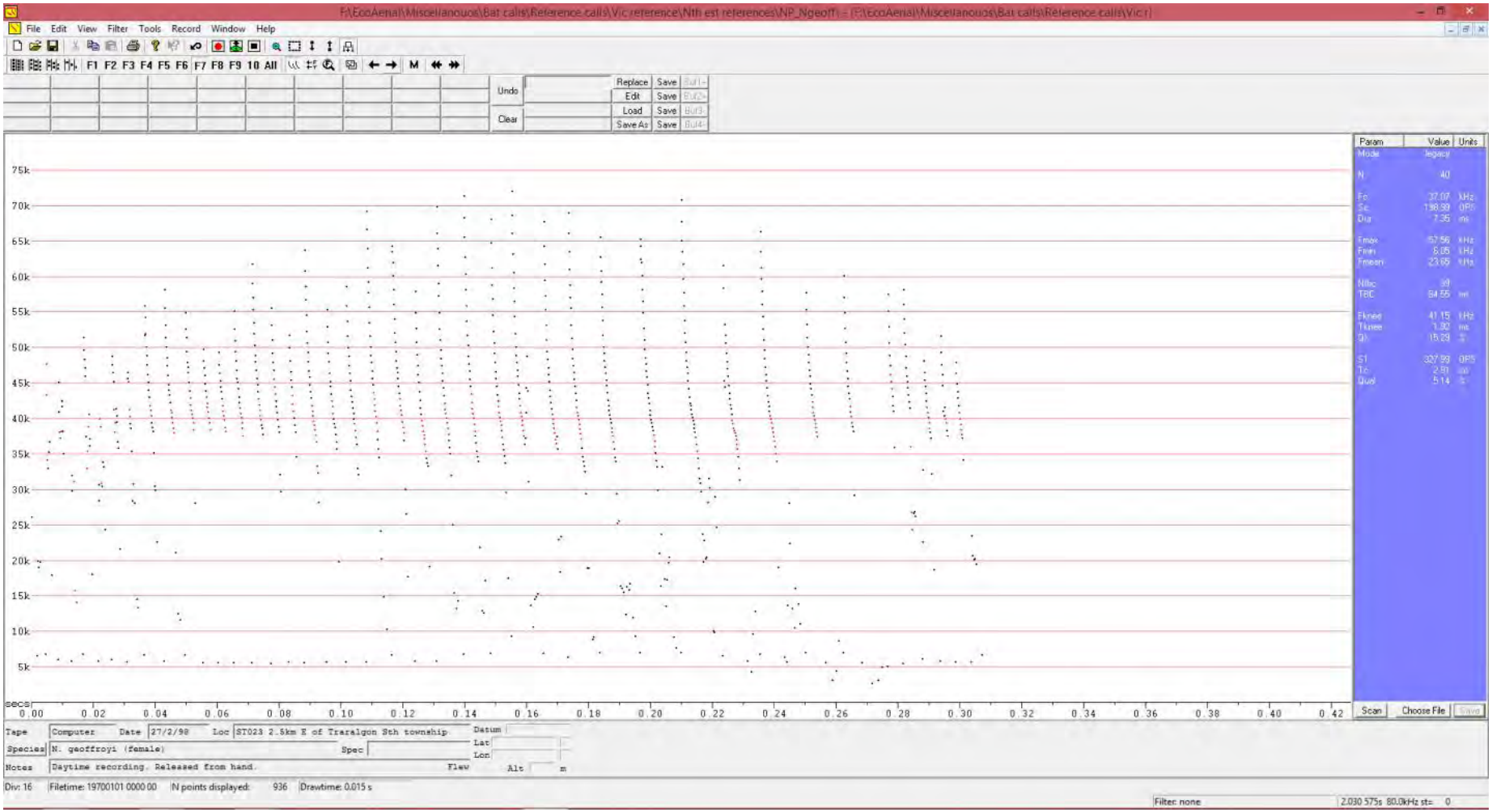

File Edit View Filter Tools Record Window Help
F1 F2 F3 F4 F5 F6 F7 F8 F9 10 All
Undo
Clear
Replace Save
Edit Save
Load Save
Save As Save
75k
70k
65k
60k
55k
50k
45k
40k
35k
30k
25k
20k
15k
10k
5k
secs
0.00 0.02 0.04 0.06 0.08 0.10 0.12 0.14 0.16 0.18 0.20 0.22 0.24 0.26 0.28 0.30 0.32 0.34 0.36 0.38 0.40 0.42
Param Value Units
Mode legacy
N 26
Fc 39.35 kHz
Sc 99.27 DPS
Dur 5.94 ms
Fmax 70.32 kHz
Fmin 16.72 kHz
Fmean 49.45 kHz
Nbc 25
TBC 93.13 ms
Fknee 44.53 kHz
Thnee 3.60
Qk 9.34
ST 360.67 DPS
Tc 5.41 ms
Goal 0.19
Scan Choose File Close
Tape Computer Date 12/2/98 Loc TM23
Species N.geoffroyi (male) Spec
Notes Day-time recording. Subject released from hand. flew
Datum
Lat
Lon
Alt m
Div: 16 Filetime: 19980212 0923 12 N points displayed: 966 Drawtime: 0.000 s
Filter: none
0.000 000s 33.7kHz str 0

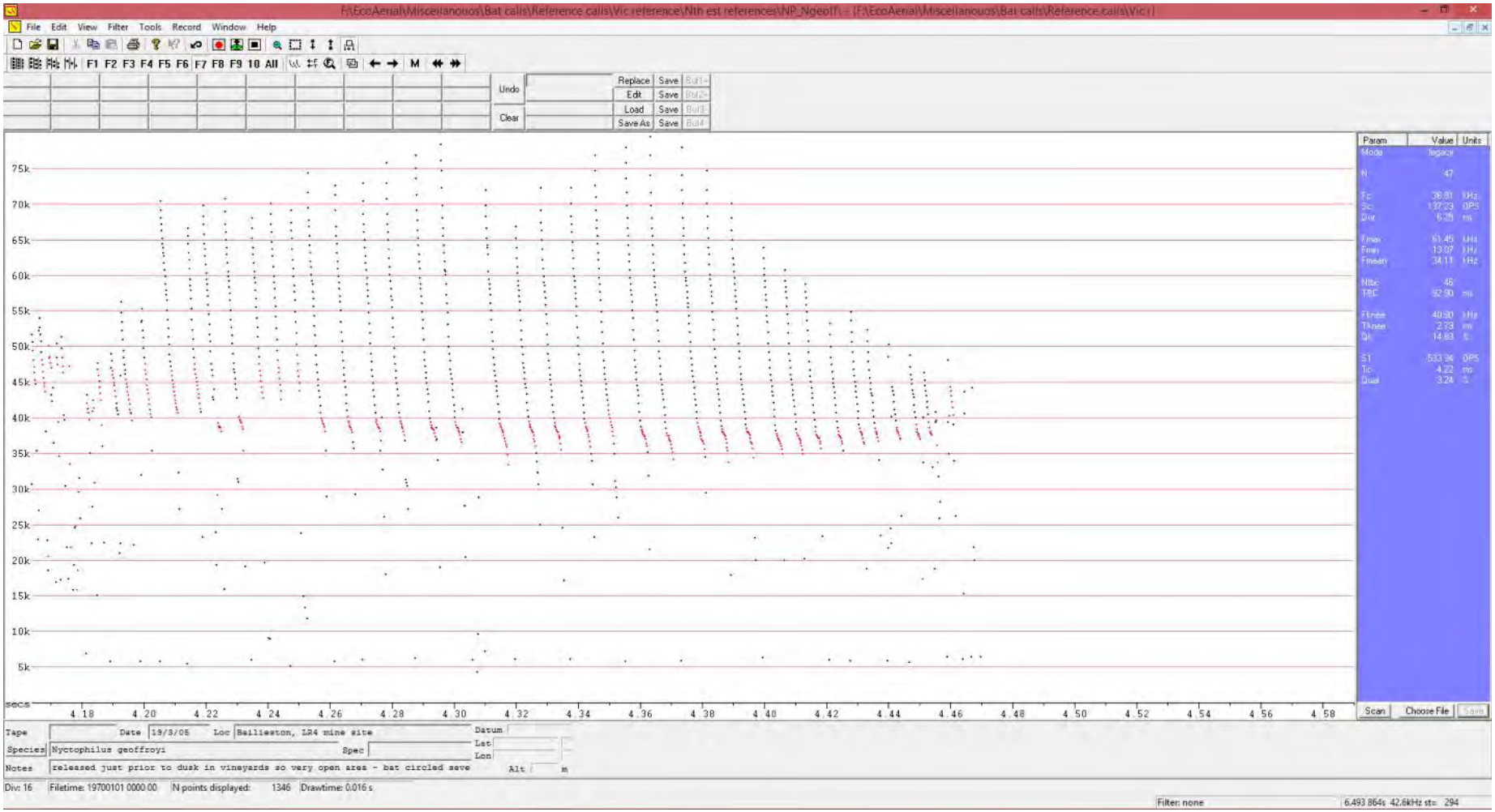

File Edit View Filter Tools Record Window Help
F1 F2 F3 F4 F5 F6 F7 F8 F9 10 All
Undo
Clear
Replace Save
Edit Save
Load Save
Save As Save
75k
70k
65k
60k
55k
50k
45k
40k
35k
30k
25k
20k
15k
10k
5k
secs
0.00 0.02 0.04 0.06 0.08 0.10 0.12 0.14 0.16 0.18 0.20 0.22 0.24 0.26 0.28 0.30 0.32 0.34 0.36 0.38 0.40 0.42
Param Value Units
Mode legacy
N 45
Fc 41.25 kHz
Sc 125.39 DPS
Dur 4.38 ms
Fmax 63.35 kHz
Fmin 30.39 kHz
Fmean 44.80 kHz
Nfbc 44
TBC 75.74 ms
Fknee 46.56 kHz
Tmax 1.58 ms
Qk 6.79 %
S1 185.92 DPS
Tc 2.39 ms
Qual 2.06 %
Scan Choose File Save
Tape Computer Date 12/2/98 Loc TM26 Datum
Species N.geof(male) Spec Lat
Lon
Notes Daytime recording. Subject released from hand. flew Alt m
Div: 16 Filetime: 19700101 0000.00 N points displayed: 1178 Drawtime: 0.016 s
Filter: none 1.423 212s 80.0kHz st= 0


File Edit View Filter Tools Record Window Help
F1 F2 F3 F4 F5 F6 F7 F8 F9 10 All
Undo
Clear
Replace Save
Edit Save
Load Save
Save As Save
Param Value Units
Mode legacy
N 28
Fc 38.63 kHz
Sc 179.57 DPS
Dur 9.51 ms
Fmax 62.97 kHz
Fmin 18.43 kHz
Fmean 36.73 kHz
Nbc 25
TBC 89.18 %
Fknee 42.27 kHz
Tknee 2.75 ms
Qk 10.77 %
BT 436.04 DPS
Tc 3.64 ms
Qual 2.25 %
75k
70k
65k
60k
55k
50k
45k
40k
35k
30k
25k
20k
15k
10k
5k
secs
0.00 0.02 0.04 0.06 0.08 0.10 0.12 0.14 0.16 0.18 0.20 0.22 0.24 0.26 0.28 0.30 0.32 0.34 0.36 0.38 0.40 0.42
Scan
Choose File
Save
Tape Computer Date 14/2/98 Loc TM002 on Mt Road Tk
Datum
Species N. geof (male) Spec
Lat
Lon
Notes Daytime recording. Subject released from hand. flew
Alt m
Div: 16 Filetime: 19980214 1131 29 N points displayed: 708 Drawtime: 0.015 s
Filter: none
0.903 225s 67.6kHz st= 0


File Edit View Filter Tools Record Window Help
F1 F2 F3 F4 F5 F6 F7 F8 F9 10 All
Undo
Clear
Replace Save
Edit Save
Load Save
Save As Save
75k
70k
65k
60k
55k
50k
45k
40k
35k
30k
25k
20k
15k
10k
5k
secs
0.00 0.02 0.04 0.06 0.08 0.10 0.12 0.14 0.16 0.18 0.20 0.22 0.24 0.26 0.28 0.30 0.32 0.34 0.36 0.38 0.40 0.42
Param Value Units
Mode legacy
N 28
Fc 41.43 kHz
Sc 169.57 OPS
Dur 4.47 ms
Fmax 53.48 kHz
Fmin 33.05 kHz
Fmean 44.79 kHz
Ntbc 27
TBC 80.19 ms
Fknee 45.10 kHz
Tknee 2.31 ms
Qk 5.46 %
ST 132.68 OPS
Tc 3.10 ms
Qual 1.09 %
Scan Choose File Open
Tape Computer Date 27/2/98 Loc ST023 2.5km E of Traralgon Sth township Datum
Species N. geoffroyi (male) Spec Lat
Notes Daytime recording. Released from hand. Flew Lon Alt m
Div: 16 Filetime: 19700101 0000 00 N points displayed: 744 Drawtime: 0.016 s
Filter: none 0.000 000s 29.2kHz st= 0

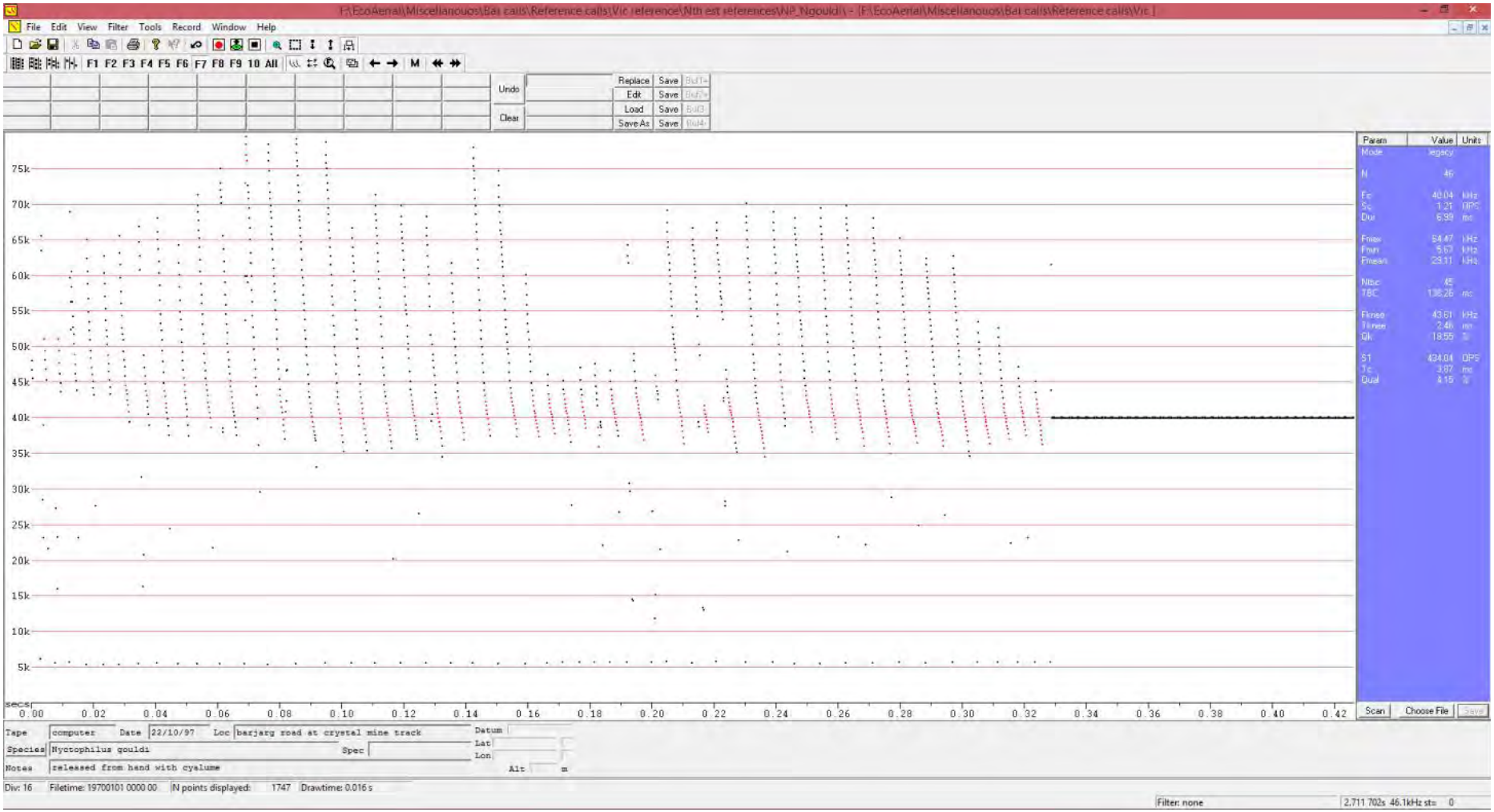

F:\EcoAerial\Miscellanouos\Bat calls\Reference calls\Vic reference\Nth est references\NP_Ngeoff\ - [F:\EcoAerial\Miscellanouos\Bat calls\Reference calls\Vic r
File Edit View Filter Tools Record Window Help
F1 F2 F3 F4 F5 F6 F7 F8 F9 10 All
Undo
Clear
Replace Save
Edit Save
Load Save
Save As Save
75k
70k
65k
60k
55k
50k
45k
40k
35k
30k
25k
20k
15k
10k
5k
secs
10.96 10.98 11.00 11.02 11.04 11.06 11.08 11.10 11.12 11.14 11.16 11.18 11.20 11.22 11.24 11.26 11.28 11.30 11.32 11.34 11.36
Param Value Units
Mode legacy
N 43
Fc 40.62 kHz
Sc 157.78 DPS
Dur 9.18 ms
Fmax 68.35 kHz
Fmin 6.00 kHz
Fmean 29.65 kHz
Nfbc 42
TBC 75.44 ms
Fknee 44.68 kHz
Fknee 3.00 ms
Qk 14.65 %
S? 367.30 DPS
Tc 3.92 ms
Qual 3.27 %
Scan Choose File Save
Tape Computer Date 27/2/98 Loc ST023 2.5km E of Traralgon Sth township Datum
Species N. geoffroyi (male) Spec Lat Lon
Notes Daytime recording. Released from hand. Flew Alt m
Div: 16 Filetime: 19980227 1700.30 N points displayed: 1517 Drawtime: 0.000 s
Filter: none
11.601 547s 70.6kHz st= 260

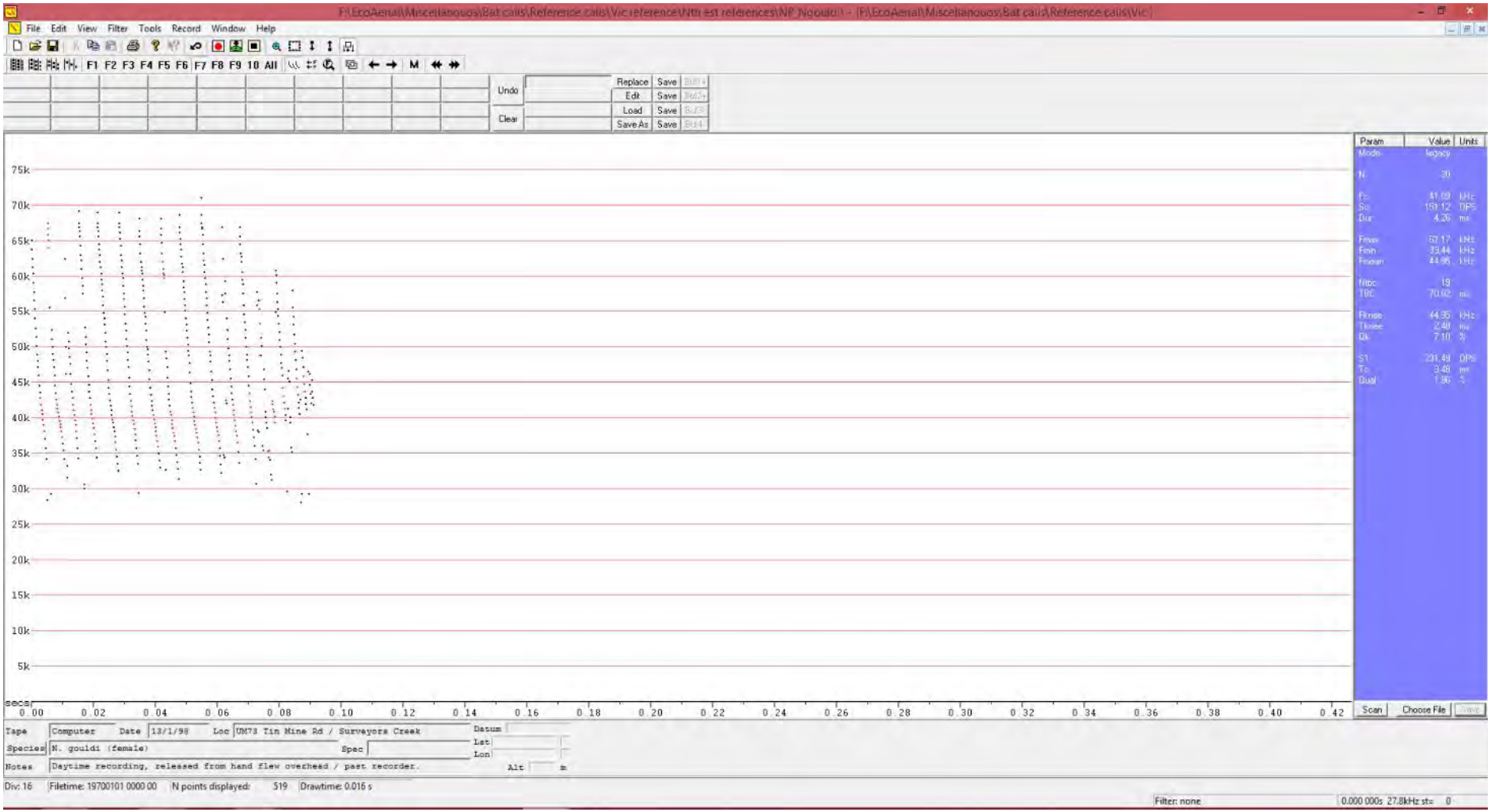

File Edit View Filter Tools Record Window Help
F1 F2 F3 F4 F5 F6 F7 F8 F9 10 All M
Undo
Clear
Replace Save
Edit Save
Load Save
Save As Save
75k
70k
65k
60k
55k
50k
45k
40k
35k
30k
25k
20k
15k
10k
5k
secs
0.00 0.02 0.04 0.06 0.08 0.10 0.12 0.14 0.16 0.18 0.20 0.22 0.24 0.26 0.28 0.30 0.32 0.34 0.36 0.38 0.40 0.42
Param Value Units
Mode legacy
N 40
Scan
Choose File
Tape Computer Date 27/2/98 Loc ST023 2.5km E of Traralgon Sth township
Species N. geoffroyi (female)
Notes Daytime recording. Released from hand.
Datum
Lat
Lon
Alt m
Div: 16 Filetime: 19700101 0000 00 N points displayed: 936 Drawtime: 0.015 s
Filter: none

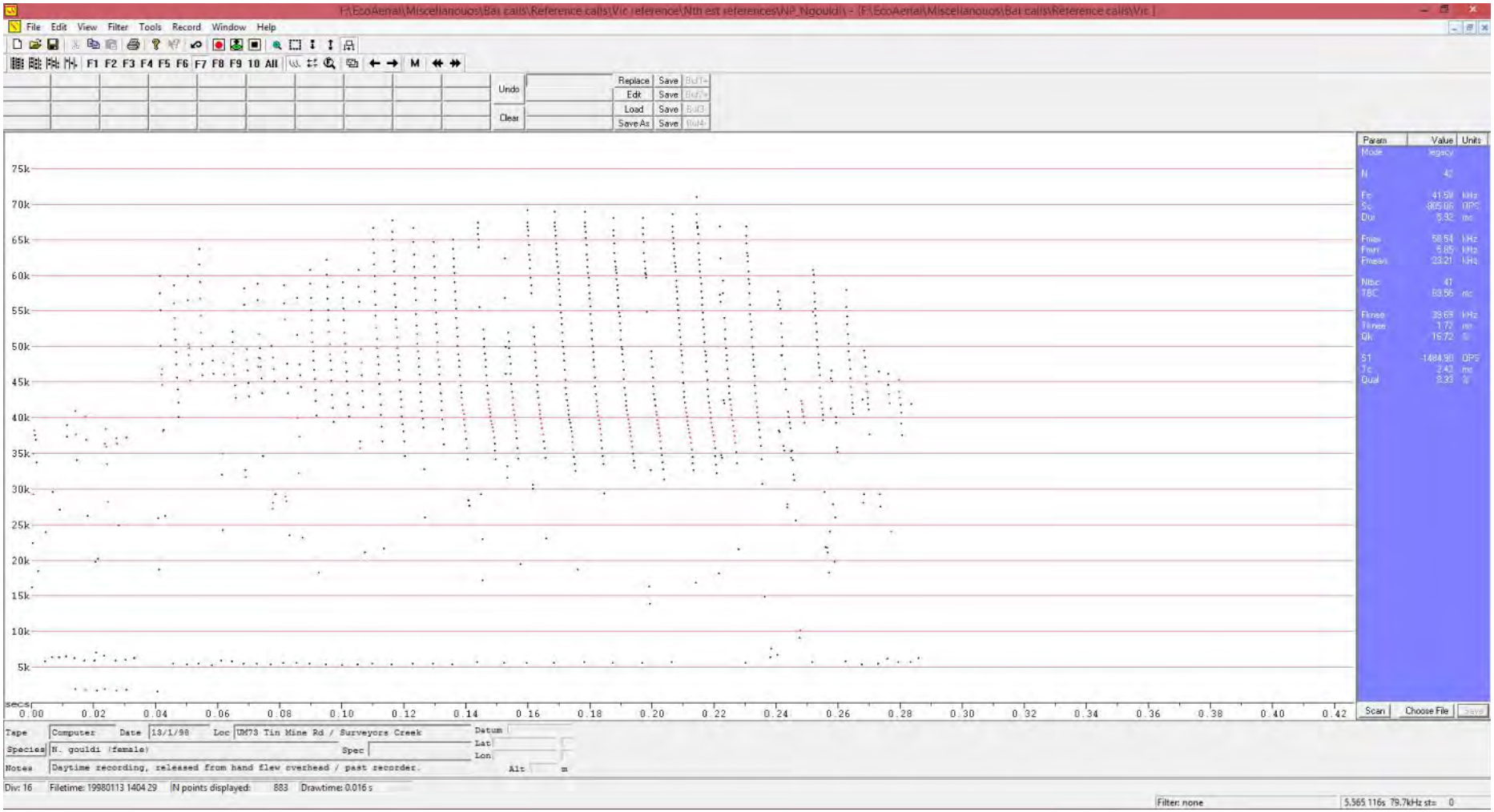

F:\EcoAerial\Miscellanouos\Bat calls\Reference calls\Vic reference\Nth est references\NP_Ngeoff\ = (F:\EcoAerial\Miscellanouos\Bat calls\Reference calls\Vic r)
File Edit View Filter Tools Record Window Help
F1 F2 F3 F4 F5 F6 F7 F8 F9 10 All M
Undo
Clear
Replace Save
Edit Save
Load Save
Save As Save
75k 70k 65k 60k 55k 50k 45k 40k 35k 30k 25k 20k 15k 10k 5k
secs
4.18 4.20 4.22 4.24 4.26 4.28 4.30 4.32 4.34 4.36 4.38 4.40 4.42 4.44 4.46 4.48 4.50 4.52 4.54 4.56 4.58
Param Value Units
Mode legacy
N 47
Tc 36.81 kHz
Sc 137.23 OPS
Dur 6.25 ms
Fmax 61.45 kHz
Fmin 13.07 kHz
Fmean 34.11 kHz
Ntbc 46
TBC 92.90 ms
Fknee 40.80 kHz
TKnee 2.73 ms
Qk 14.83 %
S1 -533.34 OPS
Tc 4.22 ms
Qual 3.24 %
Scan Choose File Save
Tape Date 19/3/05 Loc Bailieston, LR4 mine site Datum
Species Nyctophilus geoffroyi Spec Lat
Notes released just prior to dusk in vineyards so very open area - bat circled seve Lon Alt m
Div: 16 Filetime: 19700101 0000.00 N points displayed: 1346 Drawtime: 0.016 s
Filter: none
6.493 864s 42.6kHz sts: 294

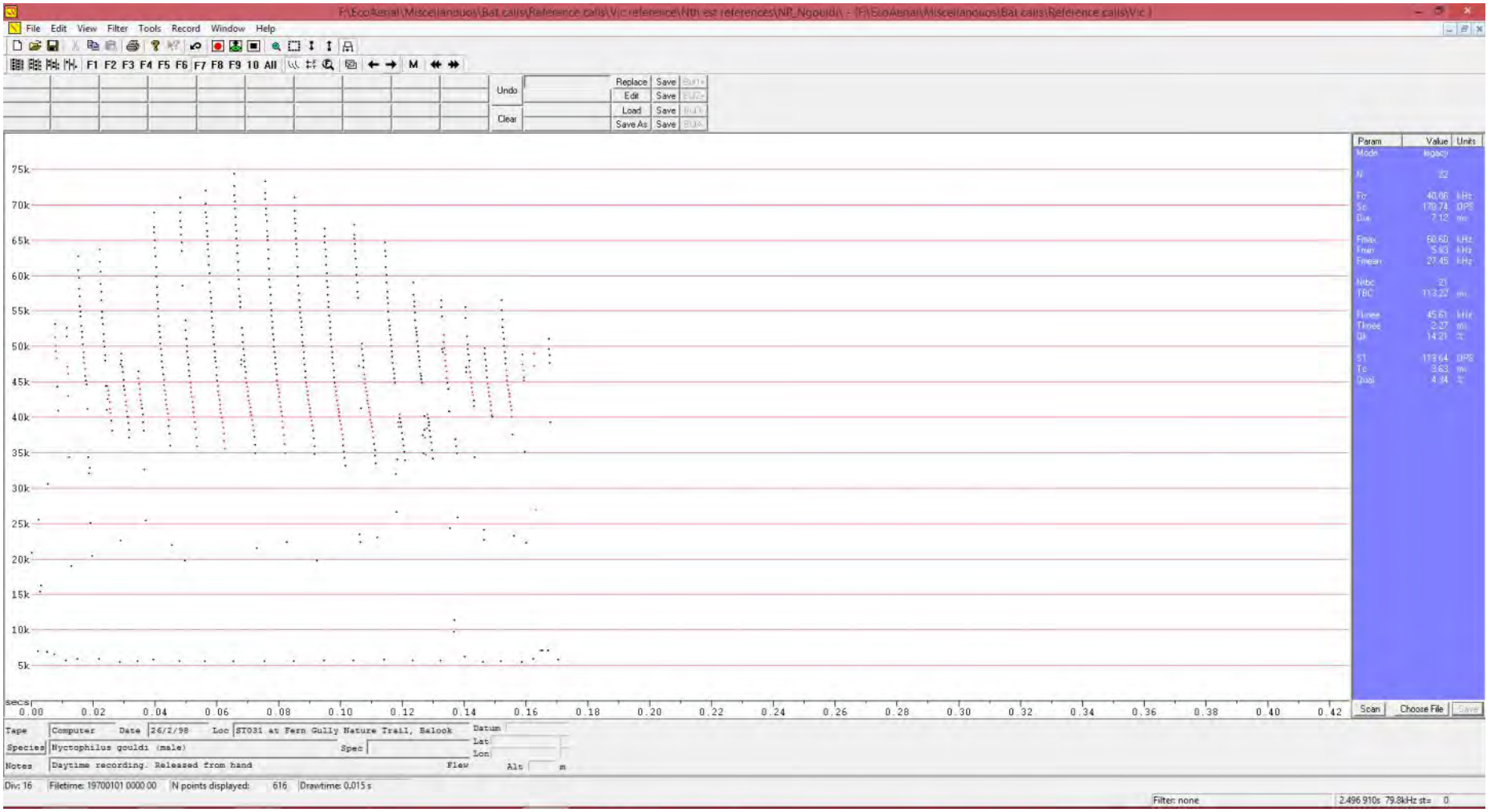
Nyctophilus gouldi

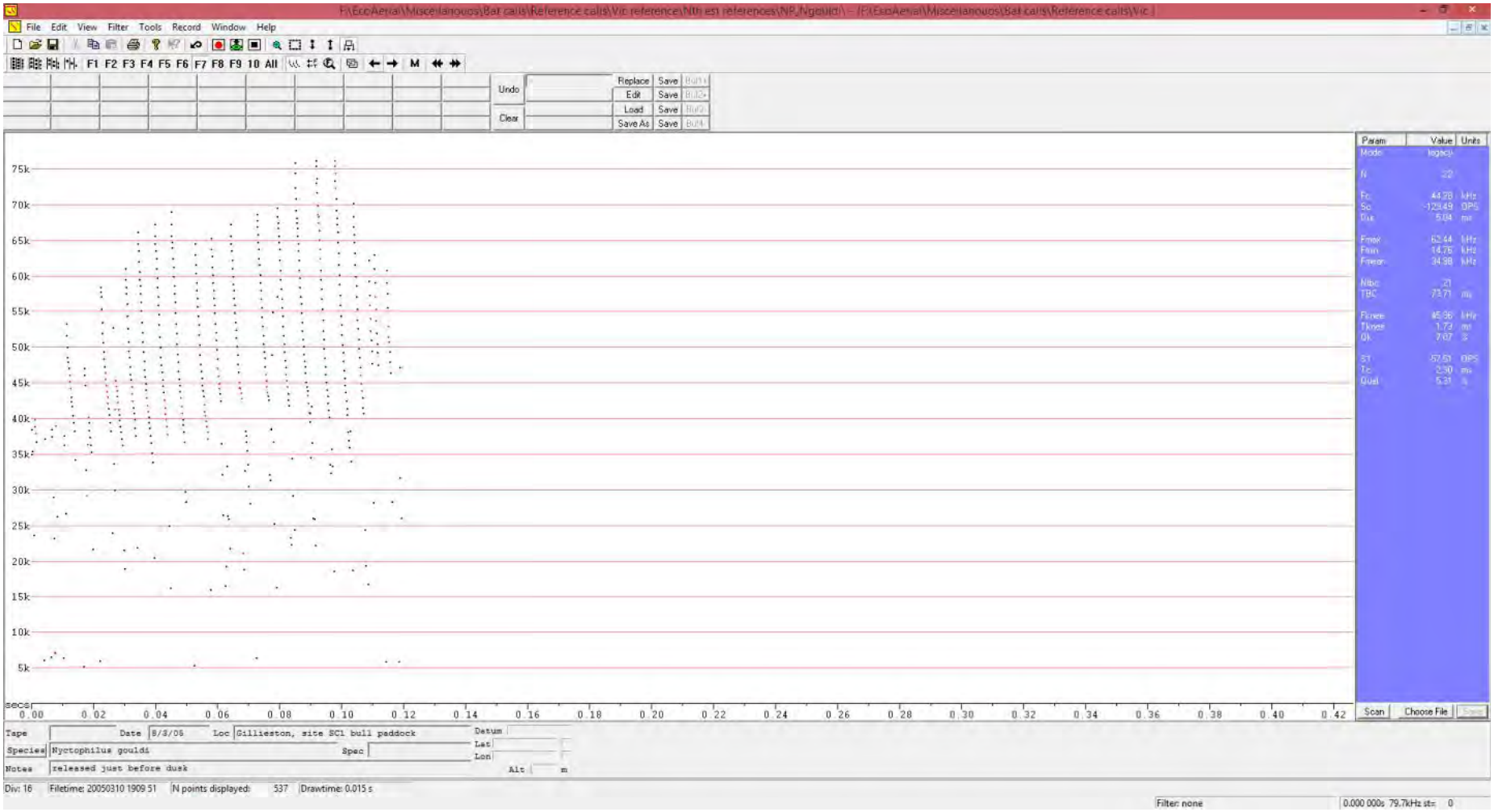
North-east Victoria Reference calls (Dr Lindy Lumsden)

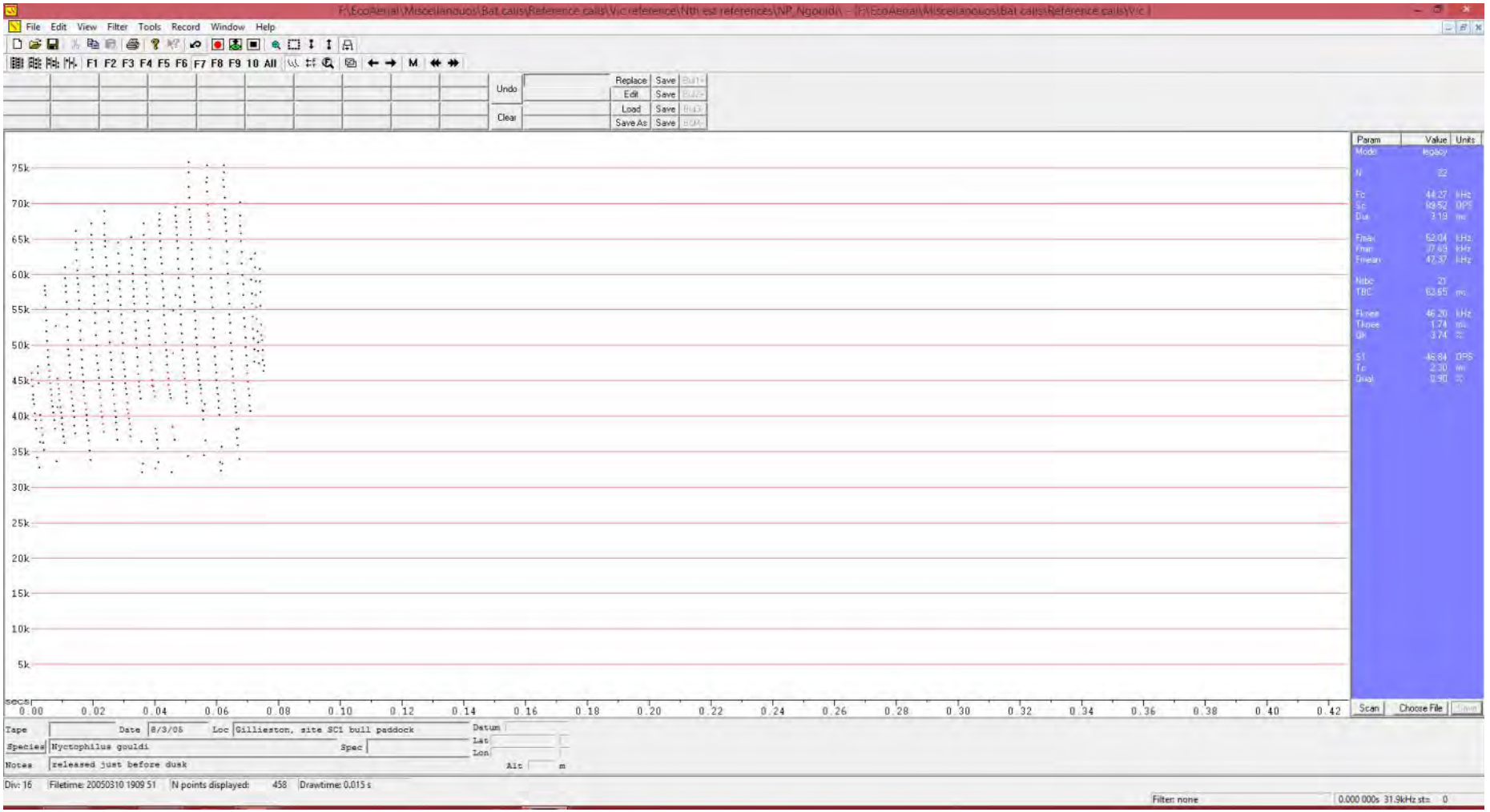

File Edit View Filter Tools Record Window Help
F1 F2 F3 F4 F5 F6 F7 F8 F9 10 All
Undo
Clear
Replace Save
Edit Save
Load Save
Save As Save
Param Value Units
Mode legacy
N 46
Fc 40.04 kHz
Sc 1.21 DPS
Dur 6.98 ms
Fmax 54.47 kHz
Fmin 5.67 kHz
Fmean 29.11 kHz
Ntbc 45
TBC 138.26 ms
Fknee 43.61 kHz
Tknee 2.46 ms
Qk 18.55 %
S1 424.04 DPS
Tc 3.87 ms
Qual 8.15 %
75k
70k
65k
60k
55k
50k
45k
40k
35k
30k
25k
20k
15k
10k
5k
secs
0.00 0.02 0.04 0.06 0.08 0.10 0.12 0.14 0.16 0.18 0.20 0.22 0.24 0.26 0.28 0.30 0.32 0.34 0.36 0.38 0.40 0.42
Scan Choose File Save
Tape computer Date 22/10/97 Loc barjarg road at crystal mine track
Species Nyctophilus gouldi Spec
Notes released from hand with cyalume
Datum
Lat
Lon
Alt m
Div: 16 Filetime: 19700101 0000.00 N points displayed: 1747 Drawtime: 0.016 s
Filter: none
2.711 702s 46.1kHz st= 0


File Edit View Filter Tools Record Window Help
F1 F2 F3 F4 F5 F6 F7 F8 F9 10 All M
Undo
Clear
Replace Save
Edit Save
Load Save
Save As Save
75k
70k
65k
60k
55k
50k
45k
40k
35k
30k
25k
20k
15k
10k
5k
secs
0.00 0.02 0.04 0.06 0.08 0.10 0.12 0.14 0.16 0.18 0.20 0.22 0.24 0.26 0.28 0.30 0.32 0.34 0.36 0.38 0.40 0.42
Param Value Units
Mode legacy
N 20
Fc 41.09 kHz
Sc 151.12 DPS
Dur 4.26 ms
Fmax 57.17 kHz
Fmin 33.44 kHz
Fmean 44.95 kHz
Nbc 19
TBC 70.02 ms
Fknee 44.35 kHz
Tknee 2.48 ms
Qk 7.10 %
S1 231.49 DPS
Tc 3.48 ms
Qual 1.96 %
Scan
Choose File
Tape Computer Date 13/1/98 Loc UM73 Tin Mine Rd / Surveyors Creek
Species N. gouldi (female)
Spec
Notes Daytime recording, released from hand flew overhead / past recorder.
Datum
Lat
Lon
Alt m
Div: 16 Filetime: 19700101 0000 00 N points displayed: 519 Drawtime: 0.016 s
Filter: none
0.000 000s 27.8kHz st= 0


File Edit View Filter Tools Record Window Help
F1 F2 F3 F4 F5 F6 F7 F8 F9 10 All
Undo
Clear
Replace Save
Edit Save
Load Save
Save As Save
Param Value Units
Mode legacy
N 42
Fc 41.59 kHz
Sc 805.66 DPS
Dur 5.92 ms
Fmax 58.54 kHz
Fmin 5.85 kHz
Fmean 33.21 kHz
Ntbc 41
TBC 53.56 ms
Fknee 39.69 kHz
Tknee 1.72 ms
Qk 16.72 %
S1 -1484.90 DPS
Tc 2.42 ms
Qual 8.33 %
Scan Choose File Save
75k 70k 65k 60k 55k 50k 45k 40k 35k 30k 25k 20k 15k 10k 5k
secs
0.00 0.02 0.04 0.06 0.08 0.10 0.12 0.14 0.16 0.18 0.20 0.22 0.24 0.26 0.28 0.30 0.32 0.34 0.36 0.38 0.40 0.42
Tape Computer Date 13/1/98 Loc UM73 Tin Mine Rd / Surveyors Creek
Species N. gouldi (female) Spec
Notes Daytime recording, released from hand flew overhead / past recorder.
Datum
Lat
Lon
Alt m
Div: 16 Filetime: 19980113 1404 29 N points displayed: 883 Drawtime: 0.016 s
Filter: none
5.565 116s 79.7kHz st= 0


F:\EcoAerial\Miscellaneous\Bat calls\Reference calls\Vic reference\Nth est references\NP_Ngouidi\ - [F:\EcoAerial\Miscellaneous\Bat calls\Reference calls\Vic]
File Edit View Filter Tools Record Window Help
F1 F2 F3 F4 F5 F6 F7 F8 F9 10 All M
Undo
Clear
Replace Save
Edit Save
Load Save
Save As Save
75k 70k 65k 60k 55k 50k 45k 40k 35k 30k 25k 20k 15k 10k 5k
secs 0.00 0.02 0.04 0.06 0.08 0.10 0.12 0.14 0.16 0.18 0.20 0.22 0.24 0.26 0.28 0.30 0.32 0.34 0.36 0.38 0.40 0.42
Param Value Units
Mode legacy
N 22
Fc 40.06 kHz
Sc 179.74 DPS
Dur 7.12 ms
Fmax 60.60 kHz
Fmin 5.63 kHz
Fmean 27.45 kHz
Nrbc 23
TBC 113.27 ms
Fknee 45.61 kHz
Tknee 2.27 ms
Qk 14.21 %
S1 119.64 DPS
Tc 3.63 ms
Qual 4.94 %
Scan Choose File Save
Tape Computer Date 26/2/98 Loc ST031 at Fern Gully Nature Trail, Balook Datum
Species Nyctophilus gouldi (male) Spec Lat
Notes Daytime recording. Released from hand Flew Lon Alt m
Div: 16 Filetime: 19700101 0000.00 N points displayed: 616 Drawtime: 0.015 s
Filter: none 2.496 910s 79.8kHz st= 0


File Edit View Filter Tools Record Window Help
F1 F2 F3 F4 F5 F6 F7 F8 F9 10 All
Undo
Clear
Replace Save
Edit Save
Load Save
Save As Save
75k
70k
65k
60k
55k
50k
45k
40k
35k
30k
25k
20k
15k
10k
5k
secs
0.00 0.02 0.04 0.06 0.08 0.10 0.12 0.14 0.16 0.18 0.20 0.22 0.24 0.26 0.28 0.30 0.32 0.34 0.36 0.38 0.40 0.42
Param Value Units
Mode legacy
N 22
Fc 44.28 kHz
Sc -129.49 DPS
Dur 5.04 ms
Fmax 62.44 kHz
Fmin 14.76 kHz
Fmean 34.98 kHz
Nlbc 21
TBC 73.71 ms
Fknee 45.96 kHz
Fknee 1.73 ms
Qk 7.07
S1 -57.51 DPS
Tc 2.30 ms
Qual 5.31
Scan Choose File Save
Tape Date 8/3/06 Loc Gillieston, site SC1 bull peddock Datum
Species Nyctophilus gouldi Spec Lat Lon
Notes released just before dusk Alt m
Div: 16 Filetime: 20050310 1909 51 N points displayed: 537 Drawtime: 0.015 s
Filter: none 0.000 000s 79.7kHz st= 0


F:\EcoAerial\Miscellanuos\Bat calls\Reference calls\Vic reference\Nth est references\NP Ngoutdi\ - [F:\EcoAerial\Miscellanuos\Bat calls\Reference calls\Vic]
File Edit View Filter Tools Record Window Help
F1 F2 F3 F4 F5 F6 F7 F8 F9 10 All
Undo
Clear
Replace Save
Edit Save
Load Save
Save As Save
75k
70k
65k
60k
55k
50k
45k
40k
35k
30k
25k
20k
15k
10k
5k
secs
0.00 0.02 0.04 0.06 0.08 0.10 0.12 0.14 0.16 0.18 0.20 0.22 0.24 0.26 0.28 0.30 0.32 0.34 0.36 0.38 0.40 0.42
Param Value Units
Mode legacy
N 22
Fc 44.27 kHz
Sc 89.52 OPS
Dur 3.19 ms
Fmax 52.04 kHz
Fmin 37.69 kHz
Fmean 47.37 kHz
Nsbc 20
TBC 63.65 ms
Finter 46.20 kHz
Tkntee 1.74 ms
QK 3.74 %
S1 -46.84 OPS
Tc 2.30 ms
Qual 0.90 %
Scan Choose File Save
Tape Date 8/3/05 Loc Gillieston, site SC1 bull paddock Datum
Species Nyctophilus gouldi Spec Lat Lon
Notes released just before dusk Alt m
Div: 16 Filetime: 20050310 1909 51 N points displayed: 458 Drawtime: 0.015 s
Filter: none
0.000 000s 31.9kHz st= 0

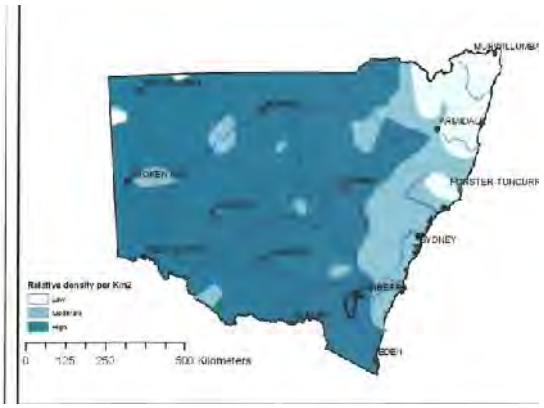
Attachment D –*Nyctophilus corbeni* records

Peer reviewed distribution maps of Nyctophilus sp in NSW and ACT Bats

Pennay, Law and Lunney 2011

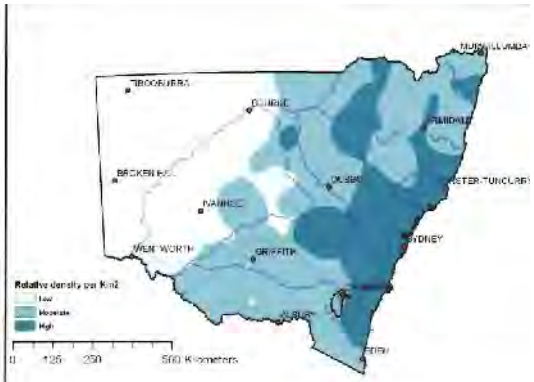
Nyctophilus geoffroyi

Legal status. Protected
Distribution: *NSW & ACT*
Range: 778,248 km^2
Max density ratio. 960:1000
Mean density ratio. 140:1000
Mean annual observation rate. 8.3%
Trend: None detected
Comments: Almost ubiquitous, very widespread and commonly reported absent only from dense rainforest areas in the north east. The patchiness of values in far west NSW probably due to inadequate sampling.



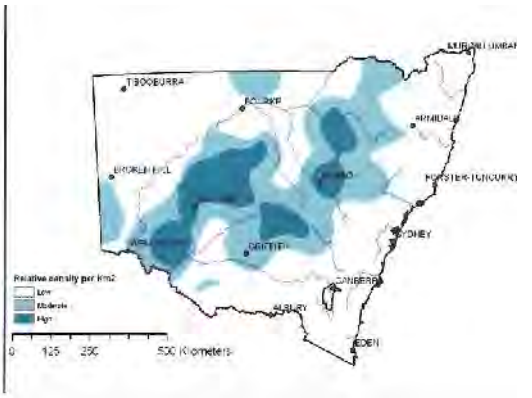
Nyctophilus gouldi

Legal status. Protected
Distribution: *NSW & ACT*
Range: 545,854 km^2
Max density ratio. 230:1000
Mean density ratio. 53:1000
Mean annual observation rate. 7.1%
Trend: None detected
Comments: Widespread and commonly reported in the eastern half of NSW and in the ACT, becoming less common on the plains and absent from arid regions of the far west.

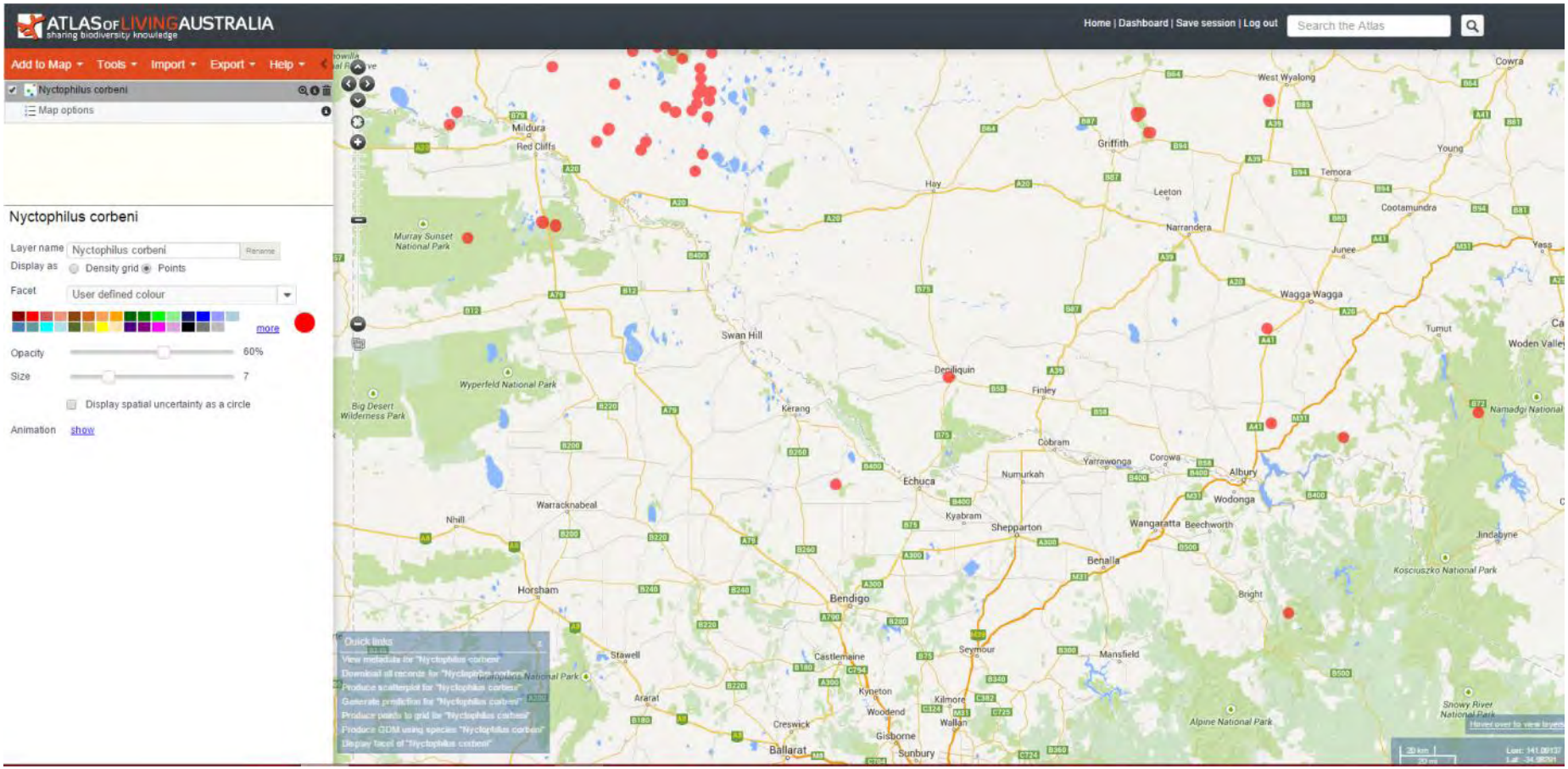


Nyctophilus corbeni

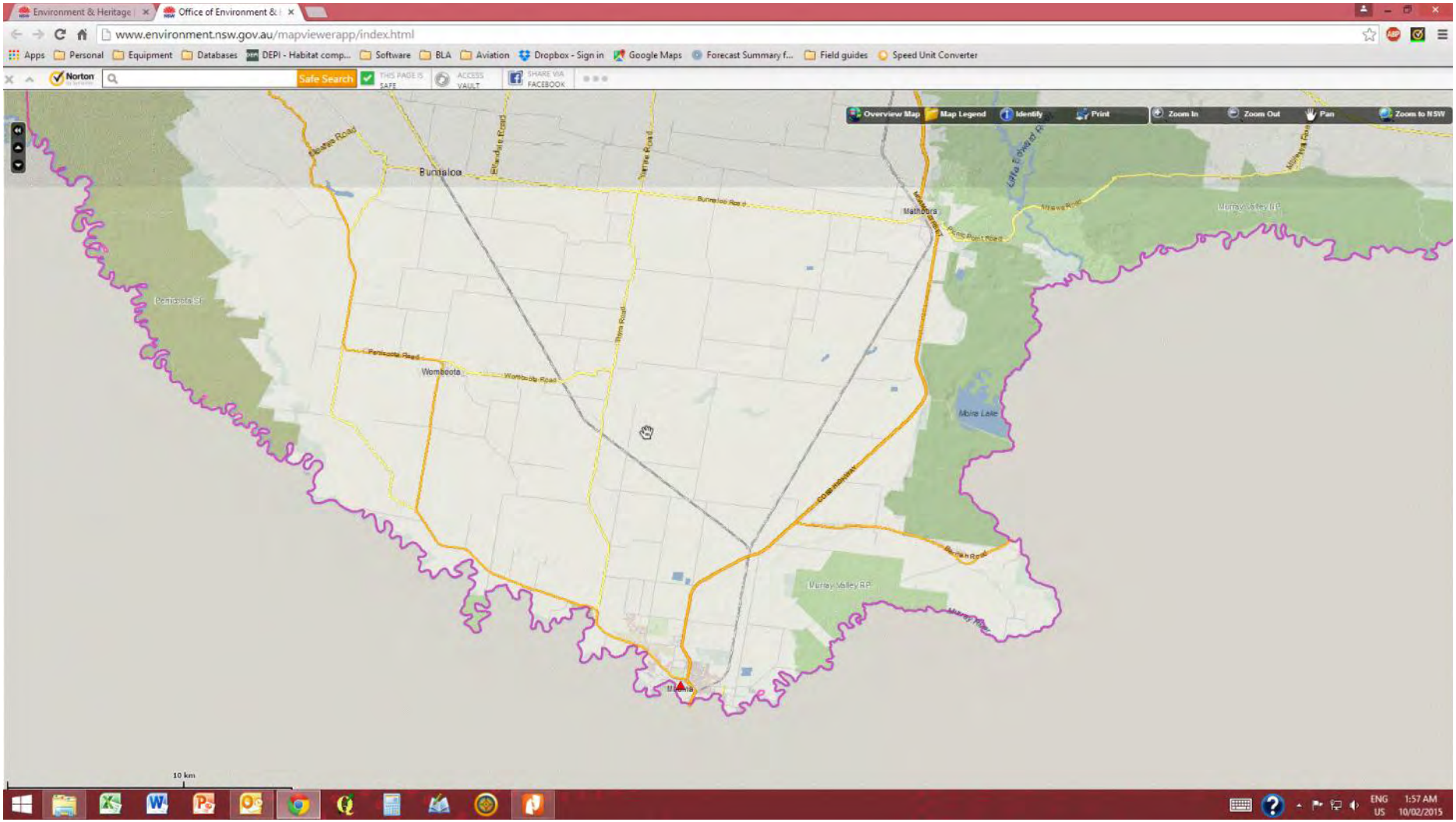
Legal status. Vulnerable
Distribution: *NSW*
Range: 324,441 km^2
Max density ratio. 390:1000
Mean density ratio. 26:1000
Mean annual observation rate. 1.4%
Trend: None detected
Comments: Relatively uncommonly reported with unusual distribution, mostly west of the Great Dividing Range (does cross into the upper Hunter Valley). Most common in Mallee and Cypress/ Ironbark regions and appears to be largely absent from the alluvial flood plains of the Murray and Darling Rivers.



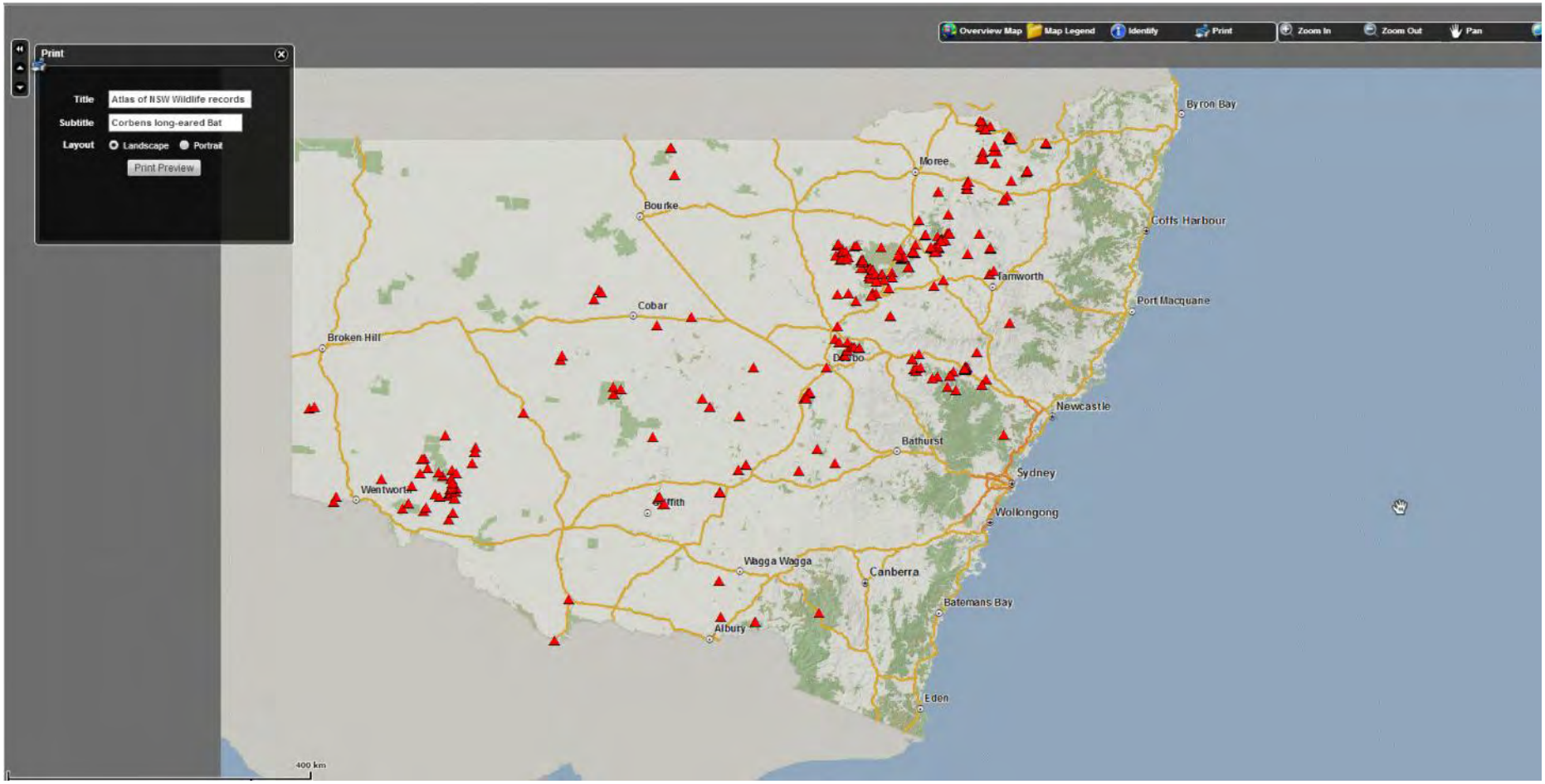
Atlas of Living Australia Corbeni records (excludes Echuca bat call/s record by Richard's).



BioNet Atlas of NSW Wildlife Echuca - Moama Region (includes Echuca bat call/s record by Richard's).



BioNet Atlas of NSW Wildlife Statewide Records (includes Echuca bat call/s record by Richard's).



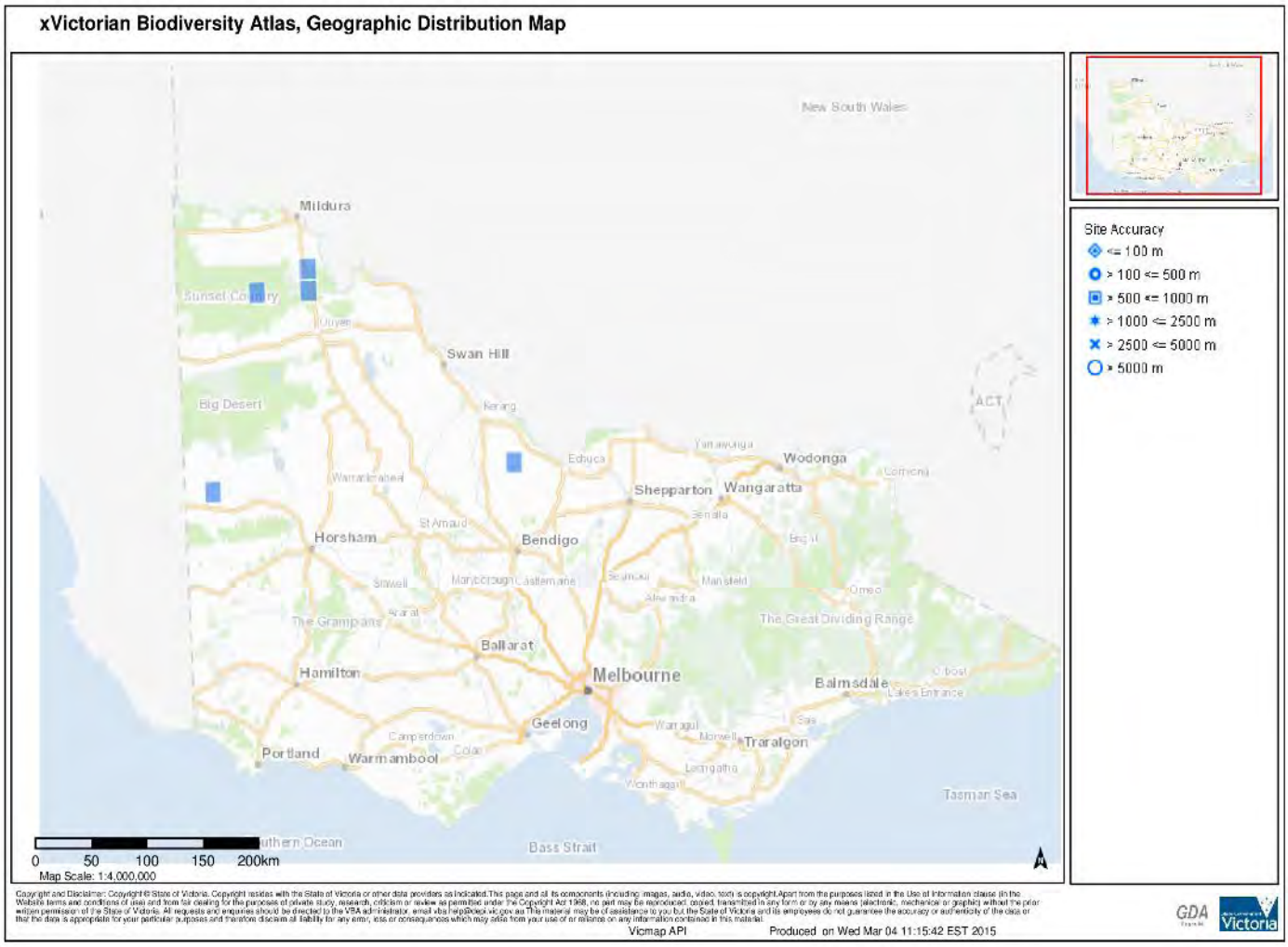
Distribution

Overall, the distribution of the south eastern form coincides approximately with the Murray Darling Basin with the Pilliga Scrub region being the distinct stronghold for this species.

Victorian Biodiversity Atlas Records (excludes Echuca bat call/s record by Richard's).

xVictorian Biodiversity Atlas, Geographic Distribution Map
(Date: 04/03/2015 11:15 AM)

Taxon Id	Scientific Name	Common Name	Discipline	Level
61332	Nyctophilus corbeni	South-eastern Long-eared Bat	Terrestrial fauna	Species



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