

**Taylor Ranch**

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**From:** "Jim Morris" <jemorris@ieee.org>  
**To:** "Taylor Ranch" <tayranch@direcpc.com>  
**Sent:** Monday, January 26, 2004 4:55 PM  
**Subject:** Re: Bat trip

Jim & Holly

I've made airline and related reservations that mesh with your proposed dates, and Wayne's retirement bash. Expect to see you on April 28th assuming weather is satisfactory that day for Ray to fly in.

Regarding bat analysis software be aware that Chris Corben is writing a new version of Analook. See below an excerpt from a recent email he sent to me. Chris Corben is one of, perhaps the top, researcher in this field. We should probably both plan to obtain this software when it is released. I can't estimate cost, but at least previously his software for ZCAIM-CF has been downloadable at no cost.

Cheers,  
Jim

At 08:39 AM 1/16/2004 -0800, you wrote:

Hi Jim,

Thanks for all the information on the ZCAIM. Can you come to Taylor Ranch for the bat work on April 28-May 5? Katie said that period would work for her. She may only stay a few days for surveys.

Holly & Jim

Jim & Holly Akenson  
Managers/Scientists  
Taylor Ranch Field Station  
University of Idaho  
HC 83 Box 8070  
Cascade, ID 83611  
[tayranch@direcpc.com](mailto:tayranch@direcpc.com)

Date: Sat, 10 Jan 2004 10:21:48 -0500  
From: Chris Corben <corben@hoarybat.com>  
Subject: Re: BATLINE: Seeking AnaBat files  
To: jemorris@ieee.org  
X-Mailer: Microsoft Outlook Express 6.00.2800.1158  
X-CanItPRO-Stream: jemorris redirected to 90\_OPT\_OUT  
X-Scanned-By: IEEE UCE Filtering Service  
X-SMTP-HELO: engine.ieee.org

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X-SMTP-MAIL-FROM: corben@hoarybat.com  
X-SMTP-RCPT-TO: jimorris@direcway.com  
X-SMTP-PEER-INFO: www5.superoptinmail.com [140.98.193.23]  
Original-recipient: rfc822;jimorris@direcway.com  
X-OriginalArrivalTime: 10 Jan 2004 18:02:36.0644 (UTC)  
FILETIME=[EDD70A40:01C3D7A3]

Gooday Jim  
Sorry for my tardy reply, but I have been away.

I would also like to draw your attention to the fact that I am currently writing a Windows version of Analook which will facilitate collection of call parameters. Part of this process will be a significant enhancement of the range of parameters which can be measured. Proposing a date for completion would be futile, as usual, but I really hope to have something on the web early this year.

Cheers, Chris.  
Chris Corben  
corben@hoarybat.com  
[www.hoarybat.com](http://www.hoarybat.com)

**Taylor Ranch**

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**From:** "Katie Gillies" <shakedown55@hotmail.com>  
**To:** <tayranch@direcpc.com>  
**Sent:** Sunday, October 12, 2003 2:11 PM  
**Attach:** Katie7.jpg; Katie and Pallid.jpg  
**Subject:** RE: Panama bat position

Great pictures Holly! It sounds like you have been really busy, but it looks like you've been having a great time. Nice caribou, I just can't get over the racks on those amazing animals! Russ and I saw a herd of caribou in Denali when I was there. They are incredible creatures. You'll have to tell me how the meat is!

I would love to come out and do some more bat stuff in the spring. I have available that same sonogram library that I sent you guys. I can send a copy to Jim Morris, if he wants. As for the ANABAT stuff, I recommend getting the new digital recorder, it will create better recordings and it won't warp the sonograms with battery power-related problems. But they are expensive. If the budget doesn't allow for that, a tape player will always do the job. And as for an ANABAT training session, *name the time*. I recently went to the state nongame meeting and gave all the nongame biologists a crash course in ANABAT. I am the official state ANABAT expert! I also got exposed to the Petterson SONOBAT program which is extremely similar, but a bit more user friendly (it runs in Windows instead of DOS!) Have you two had the opportunity to review the ANABAT materials I sent you? The ANABAT disk has a readme file t

Let me know more about Jim Morris's stuff and everything. I am working on applying to grad schools now. I just took the GREs last week (thank God that thing is over with!). I have a meeting at Potlatch to discuss a potential graduate project with bats. Also, I am developing a proposal to study the Hawaiian hoary bat using EPA funds (actually, its a \$74,000 STAR grant that is really competitive, so wish me luck on that!) I miss you guys and hope all is well, as always. Take care and I'll talk to you soon!

Katie

>From: Taylor Ranch  
 >To: Katie Gillies  
 >Subject: RE: Panama bat position  
 >Date: Sat, 11 Oct 2003 00:58:53 -0700  
 >MIME-Version: 1.0  
 >Received: from a34-mta01.direcway.com ([66.82.4.90]) by mc7-f9.hotmail.com with Microsoft SMTPSVC(5.0.2195.5600); Sat, 11 Oct 2003 12:49:06 -0700  
 >Received: from TAYRANCH (dpc69190001.direcpc.com [69.19.0.1]) by a34-mta01.direcway.com (iPlanet Messaging Server 5.2 HotFix 1.12 (built Feb 13 2003)) with SMTP id <0HMK00026ZCITK@a34-mta01.direcway.com> for shakedown55@hotmail.com; Sat, 11 Oct 2003 02:59:07 -0400 (EDT)  
 >X-Message-Info: JGTYoYF78jEHjJx36Oi8+YDSEg8qKPPD  
 >Message-id: <003f01c38fcd\$8b2e7090\$744a6f0a@TAYRANCH>  
 >X-MIMEOLE: Produced By Microsoft MimeOLE V6.00.2800.1165  
 >X-Mailer: Microsoft Outlook Express 6.00.2800.1158

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Taylor Ranch

From: "Karen Gilie" <shakedown5@hotmail.com>  
To: <shakedown5@hotmail.com>  
Sent: Sunday, October 12, 2003 2:11 PM  
Subject: RE: Panama bat position

Great pictures Holly! It sounds like you have been really busy, but it looks like you've been having a great time. I just can't get over the fact of those amazing animals. I use and I saw a herd of caribou in Denali when I was there. They are incredible creatures. You'll have to tell me how the meat

I would love to come out and do some more bat stuff in the spring. I have available that same sonogram software that you gave me. I can send a copy to you when it's available. As for the ANABAT stuff, I recommend getting the new digital recorder. It will create better recordings and it won't wear the programs will be very power related programs. But they are expensive. If this doesn't allow for that a tape player will always do the job. And as for an ANABAT training session, name the time. I recently went to the state homepage meeting and gave all the homepage biologists a crash course in ANABAT. I am the official state ANABAT expert. I also got exposed to the Patterson SONOBAT program which is extremely similar, but a bit more user friendly. It runs in Windows instead of DOS. Have you had the opportunity to review the ANABAT materials I sent you? The ANABAT disk has a resume file.

Let me know more about Jim Morita's stuff and everything. I am working on applying to grad schools now. I just finished GRE's last week (thank God that thing is over with). I have a meeting at Patagonia to discuss a potential graduate project with data. Also, I am developing a proposal to study the Hawaiian monk seal using BRANDS technology. It's a 17,400 STAR grant that is really competitive. So with my luck on that! I miss you guys and hope all is well, as always. Take care and I'll talk to you soon!

<X-Mailer: Microsoft Outlook Express 6.00.2800.1158  
>X-MIME-Version: 1.0  
>Date: Sat, 11 Oct 2003 02:58:53 -0700  
>Subject: RE: Panama bat position  
>From: Taylor Ranch  
>To: Karen Gilie  
<Received: from 234-mts01.dirway.com [66.82.4.90] by mcf-19@hotmail.com with Microsoft SMTPSVC [66.82.4.90] Sat, 11 Oct 2003 12:43:08 -0700  
<Received: from TAYRANCH [66.82.4.90] by 234-mts01.dirway.com (Microsoft Exchange Server) Sat, 11 Oct 2003 02:59:07 -0400 (EDT)  
<Message-ID: <003101c38fed8b2e7095744810a@TAYRANCH>  
<X-Header: 10T 0YF 8IE 8JX 3018+YD2E 80KFRD  
mts01.dirway.com <for shakedown5@hotmail.com, Sat, 11 Oct 2003 02:59:07 -0400 (EDT)>  
(Printed Message Server 5.2 Host 1.15 (Full Host 1.2003)) with SMTP [66.82.4.90] by 234-mts01.dirway.com

## Taylor Ranch

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**From:** "Jim Morris" <jemorris@ieee.org>  
**To:** <tayranch@direcpc.com>  
**Sent:** Monday, September 15, 2003 1:50 PM  
**Subject:** Bat detection & identification

Holly,

It was great to again visit Taylor Ranch (my 5<sup>th</sup> visit) this summer and to see you and Jim. We spoke briefly about bat studies and I'd like to extend that discussion. Separately I'll be mailing some documentation that does not lend itself to email.

As I mentioned I purchased an AnaBat detector shortly after my visit in Aug. 2002. These detectors are normally used with a ZCAIM (Zero Crossing Analysis Interface Module) and some type of recording device. Katie Gillies used both a tape recorder and a laptop. Tape recorders tend to be problematic as you can read in the mailed material. Titley Electronics accordingly introduced a new ZCAIM in 2002 that records directly to removable memory chips (the same Compact Flash Memories used in many digital cameras) which eliminates the need for field tape recorders. For a full description see <<http://www.titley.com.au/anabatcf.htm>>. These new ZCAIM-CF Modules do a better job of recording and provide numerous additional functions (example simultaneously recording input from a GPS receiver). It is Titley's ZCAIM-CF that I purchased and have been using. Its cost is slightly greater than the earlier models but does not require one to buy a tape recorder.

Recording bat echolocation vocalizations is the easy part. Analysis is where time and effort is most needed. From what I've read there are two basic approaches to species identification from AnaBat recordings.

One approach is to analyze each recording using any one of the several similar software packages (Analook, Analyse for DOS, Analyze for Windows 95, etc.) and then compare screen images and parameters with a reference voucher recording such as contained in the library sold by O'Farrell. I believe that's the method Katie was using during my visit to Taylor.

A second approach is a more statistical method. I will not try to fully describe that approach since you can access an excellent tutorial and worked example online <<http://members.ozemail.com.au/~jollys/>>. In this method parameters are extracted as in the method above but entered into a statistical package (from SPSS) and compared to mean values for several species to produce specific probabilities that unknown belong to each of the voucher species. Mathematically this is solid statistics.

I'm looking to try to extend that methodology. Method One, above, compares an unknown to a single voucher example. Method TWO, above, rigorously compares each parameter to the mean values of that parameter for several species.

As I see it the various parameters of a given species probably vary considerably for a variety of causes, including the bat's age, gender, geographical region, activity etc. For example my initial look at the parameter fmax for *Eptesicus fuscus* shows a mean of 46.01kHz with a standard deviation of 13.3kHz. The variance of a particular parameter is also likely to be different for different species. For that reason I want to include both the mean values for the voucher files but also the expected variance.

I'll try to write a detailed outline of my approach as it evolves so as to allow for peer review. I'll need

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guidance, as I'm not a trained biologist. My first order of business is creating a database of reference AnaBat voucher calls for the species that I hope to identify. The greater number of calls in that data base the better statistically (but more work for me). I'd like to include all species found or likely to be found at Taylor Ranch. I've got one listings of bat species likely to be found in Idaho but would appreciate your input (or Katie's if available) as to the species you suspect, or know, reside in your area. The Univ. of New Mexico has online a wonderful database of AnaBat files many of which I've downloaded. I will need more, however, as not all species are included and for some species the numbers are not statistically significant. Once I know all the species of interest I plan to solicit files other researchers may have using the Batline message board.

I continue to entertain thoughts of flying in to Taylor in the late winter or early spring both to see the area in another season and to pursue a possible joint effort on bat detection and identification.

Jim Morris

As I mentioned I purchased an AnaBat detector early after my visit in Aug 2002. These detectors normally used with a ZCAIM (Zero Crossing Analysis Interface Module) and some type of recording device. Katie called used both a tape recorder and a laptop. The tape recorder (and to no surprise as you can read in the mailed material, Tilley Electronics accordingly introduced a new ZCAIM in 2002 that records directly to tamperable memory chips the same Compact Flash Modules used in many digital cameras) which eliminates the need for field tape recorders. For a full description see <http://www.tilley.com/subsite/for.htm>. These new ZCAIM-CP Modules does connect to a recording box provide numerous additional functions (example simultaneously recording input from a GPS receiver). It is Tilley's ZCAIM-CP that I purchased and have been using. The cost is slightly greater than the earlier models but does not require one to buy a tape recorder.

Recording bat echolocation vocalizations is the easy part. Analysis is where time and effort is most needed. From what I've read there are two basic approaches to species identification from AnaBat recordings.

One approach is to analyze each recording using any one of the several similar software packages (Avisoft, Avisoft for Linux, Analyse for Windows 95, etc.) and then compare screen images and parameters with a reference voucher recording such as contained in the library sold by O'Farrell. I believe that's the method Katie was using during my visit to Taylor.

A second approach is a more statistical method. I will not try to fully describe that approach since you can access an excellent tutorial and worked example online (<http://members.ozemail.com.au/~jolya/>). In this method parameters are extracted as in the method above but entered into a statistical package (from SPSS) and compared to mean values for several species to produce species probabilities that unknown belong to each of the voucher species. Mathematically this is solid statistics.

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I'll try to write a detailed outline of my approach as it evolves and as to allow for peer review. I'll need

**Taylor Ranch**

**From:** "Jim Morris" <jemorris@ieee.org>  
**To:** "Taylor Ranch" <tayranch@direcpc.com>  
**Cc:** <shakedown55@hotmail.com>  
**Sent:** Friday, January 16, 2004 7:15 AM  
**Subject:** Re: Bat trip

Hi Jim & Holly,

Thanks for the photos. Looks pretty white and cold, almost like Pennsylvania. We don't get as cold or as much snow as TR but we need to deal with it in traffic that are frequently in gridlock even in good weather.

Formal name of my unit is "Anabat CF Storage ZCAIM" and generally referred to as a ZCAIM-CF. "ZCAIM" is acronym for Zero Crossing Analysis Interface Module. The "CF" refers to the type of memory card used; namely a "Compact Flash". These memory cards are one of the commonly used types popular for digital cameras.

I don't have Titley Electronics current price list but can supply prices from fall of 2002 when I purchased my units and the conversion at today's exchange rate. I'm including all that I think you might need, including items that you would likely purchase in the USA.

ZCAIM-CF storage unit \$AUD880.

Book "Anabat System Practical Guide Book" \$AUD25.

Total from Titley \$AUD 905. which at recent exchange rate of 0.7775 translates to US\$703. To that you need to add Australian 5% export fee, any Titley price increase, and shipping. US does not charge an import duty currently. Best estimate US\$800. total.

**IMPORTANT**

Older Anabat detectors are not compatible with the ZCAIM-CF unless updated. Ask Katie to check serial number of her/TR's detector. Number can be found in battery compartment. If it ends in the letter "G" it will work. If it does not it can be modified either in Australia by Titley or in the US by Nevada Bat Technology (Tony Messina) <nevadabat@ix.netcom.com> Sorry but I don't know upgrade cost.

From US sources I'd suggest:

At least one Compact Flash memory card in a 64MB size. These typically sell for about \$35 each. Note one 64MB card will hold about 40,000 Anabat calls or enough to record every night for a week. Flash memory is easily downloaded so card can be erased and reused just as people do with digital cameras. You would also need some card reader to interface with your computer. Card readers come with a variety of interfaces (PCMCIA, USB, Parallel Port etc.) I use a PCMCIA for my laptop which cost about \$12. USB readers are about \$35. I'd suggest avoiding parallel port readers as expensive, slowest and inconvenient. Lastly I'd suggest purchasing the "Anabat System Manual" (US/Canada version) from O'Farrell Biological Consulting in Las Vegas for \$35.

Total from US sources about \$100 depending on reader selected.

Some software comes with ZCAIM-CF and with Anabat System Manual. Other software and updates are available on-line for free download. For example Chris Corben

<corben@hoarybat.com> regularly provides new and improved versions. I also have some of Simon Jolly's software (somewhat dated) but understand from a recent Batline message that he is dropping his web site due to SPAM issues. Overall you may not need to include a software line in your grant request. I

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do a lot of processing of files and data using Microsoft Word and Excel which I'm assuming you already have available. I don't see the need as yet for Statistical software, but do use SigmsPlot for technical graphing.

I should also mention that the ZCAIM-CF is also capable of interfacing with many commonly available GPS receivers. Recording positions, including recording while bat recording, you might find useful. I haven't tried this with my Garmin GPS but may try it some day.

Cheers,  
Jim

At 09:03 AM 1/14/2004 -0800, you wrote:

Hi Jim,

I will email Katie and try to pin down some dates. Do you want to shoot for the first week of May so you could stay in Idaho for Wayne's retirement party? I have not reviewed all the information you have sent us and the web site on the Anabat and the "recorder". I want to submit a grant request to IDF&G nongame grants to see if they will provide funds for the purchase of the hardware and software you have for analyzing bat sonograms. Can you tell me what those items are called and price?

Attached are a few winter photos from Taylor Ranch from the last few days.

Holly

Jim & Holly Akenson  
Managers/Scientists  
Taylor Ranch Field Station  
University of Idaho  
HC 83 Box 8070  
Cascade, ID 83611  
tayranch@direpc.com