

Sponsored by The Wildlife Society – Western Section

Noninvasive Acoustic Monitoring of Bats, Field Techniques Workshop
Tuesday, May 15 to Friday, May 18, 2012
Location: Swanton Pacific Ranch, Santa Cruz Mountains, north of Davenport, Ca.
Instructor: Joe Szewczak, Ph.D., Professor, Humboldt State University, developer of
SonoBat software

Coordinator/Contact for Questions: Cynthia Perrine, [csgperrine<at>yahoo.com](mailto:csgperrine@yahoo.com)

Description:

This workshop will introduce participants to noninvasive acoustic monitoring and species identification of bats. Beginning with the fundamentals of acoustics to interpret the biology and ecology of echolocation; we'll work to understand how bats use sound and how we can interlope into this realm to survey and monitor bats. From this foundation, participants will then learn the theory and practice of recording and analyzing ultrasonic bat vocalizations to interpret bat activity and species presence. Field outings will provide hands-on experience in deploying equipment and acquiring data to process. Tools and techniques for both short term and long-term passive monitoring of bats and automated data processing will be demonstrated. Participants will recognize the acoustic characteristics of western North American bats essential for species discrimination. Full spectrum acoustic techniques will be emphasized, as recommended by the new USFWS guidelines for Wind and Wildlife when species ID is important. Meals are included.

NOTE: We will not handle bats during this workshop. 20 participants maximum!

Brief Schedule – see below for detailed daily schedule

Tuesday

5:00 p.m. Registration, check-in, set up housing
6:00 p.m. Introductions of Participants/Instructors 6:30 p.m. Dinner
7:30 p.m. Demonstration: Set up acoustic monitoring stations near Preserve Headquarters
8:30 p.m. Walkabout near Preserve Headquarters actively monitoring bats

Wednesday

8:00 a.m. Coffee/Breakfast 9:00 a.m. Lecture: Echolocation 101 12:15 pm Lunch
1:30 pm Lecture: Recording Engineering 101 4:30 pm Long Break 6:00 pm Dinner
7:30 pm Field techniques, set up recording stations, active acoustic monitoring 10:00 pm Return

Thursday

8:00 a.m. Coffee/Breakfast 9:30 a.m. Return to field site to retrieve overnight data
10:45 a.m. Lecture/Demonstration/Activity: What bat is that? (Lunch and long break included)
5:20 p.m. Set up recording equipment
6:00 p.m. Dinner 7:30 pm Head to field site, set up recording stations, active acoustic monitoring
10:00 p.m. Return from field

Friday

8:00 a.m. Coffee/Breakfast 9:30 a.m. Return to field site to retrieve overnight data
10:45 a.m. Lecture: Acoustic study design 11:45 am Break out session- download data from previous night, begin data analysis 12:15 pm Lunch 1:15 pm Continue data analysis, compile species lists
2:00 p.m. Lecture/Discussion: Recommendations for specific monitoring projects (rare species surveys, presence/absence surveys, wind energy, impact studies); Final recommendations and participant forum
3:00 p.m. Workshop concludes

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Accommodations:

Lodging is included, and is in shared yurts, or there is ample space to camp. Outdoor (HOT) showers and indoor bathrooms are available to all registrants.

Registration:

\$495 TWS WS Regular

\$530 non-members

\$195 TWS WS Student*/New Professionals**

*Students show proof of current (half-time minimum) university enrollment

**New Professionals (within 6 months of University graduation or employed part-time/seasonally in a wildlife-related job assignment)

All meals, from Dinner Tuesday to Lunch Friday are included in the workshop. Please submit any dietary restrictions with registration.

The maximum enrollment is 20 after which, a waiting list will be kept. A minimum of 10 participants must register for the workshop by **May 1** or the workshop will be cancelled and all registration fees will be returned. Registrants will be processed in the order received and successful registrants will receive workshop logistics and information once receipt of full payment is confirmed.

All registrants please complete on-line registration <http://joomla.wildlife.org/Western/>

Payment by purchase order or check should be accompanied by a printout of the online registration form and sent to:

The Western Section of The Wildlife Society

attn: Bat Workshop

Post Office Box 6756

Albany, CA 94706

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Draft - Detailed Schedule: 2012 Acoustic Monitoring of Bats Workshop

Tuesday

- 5:00 p.m. Registration check-in, camp-site selection
- 6:00 p.m. Introductions of Participants and Instructors
- 6:30 p.m. Dinner
- 7:30 p.m. Demonstration: Set up acoustic monitoring stations near Preserve Headquarters
- 8:30 p.m. Walkabout near Preserve Headquarters actively monitoring bats

Wednesday

- 8:00 a.m. Coffee, 8:30 a.m. Breakfast
- 9:00 a.m. Echolocation 101
 - a) principles and biomechanics of echolocation; how bats use sound
 - b) the advantages/disadvantages of echolocation
 - c) what animals use ultrasound, why, and how
 - d) why bat calls are different from bird calls (and more difficult to discriminate)
 - echolocation calls serve a utility function; no selective force to be different;
 - different foraging strategy– different calls; similar strategy...
 - e) echolocation biology and ecology
- 10:00 am Break
- 10:20 am Echolocation 101 continued
 - f) The mechanics of sound and how it carries information
 - wave theory: frequency, velocity, amplitude; frequency and spatial resolution
 - what bats can detect, what they can't
 - call morphology and foraging strategies; the ecophysiology of echolocation
 - how noise (and other bats) affects echolocation
 - advantages/limitations of capture methods
 - advantages/limitations of acoustic methods
 - what information can be acquired acoustically
 - Where and how to collect calls; practical advice
 - Monitoring program design, implementation, and data analysis
- 11:10 am Break
- 11:30 am Understanding bat detectors and how they work (know your tool)
 - heterodyne
 - zero-crossing
 - frequency division
 - time expansion/ full-spectrum
 - limitations and advantages
 - advances in acoustic recording technology, methods, and analysis
 - active vs. passive monitoring
 - automated recording
- 12:15 pm Lunch
- 1:30 pm Recording Engineering 101- setting up to acquire data
 - Understanding and using digital sound recording
 - recording, recording settings; notes and filenames
 - equipment connections; mono and stereo
 - selecting the sound format
 - adjusting recording gain to optimize resolution; software gain setting
 - selecting the the sequence duration to save
 - sound playback
 - manual call recording
 - monitoring and triggering
 - sound playback

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- selecting time-continuous sequences
- recognizing and avoiding sources of unwanted ultrasound
- automated call recording; digital recorders, computers, ~~tape recorders~~
- setting preferences, naming schemes, setting trigger level
- direct to computer, ~~downloading tapes~~
- 2:45 pm Break
- 3:10 pm What bat is that?
 - Acquiring reference libraries
- 3:30 Call and sequence morphology and terminology
 - sequence (i.e., bat pass) information
 - call information
 - interpreting call morphology
 - call parameters
 - distortion and quality
 - harmonics
 - recording limitations
 - out of range calls
 - mimicry
- 4:30 pm Break (Hors d'ourves)
- 6:00 pm Dinner
- 7:30 pm Head out to field site to set up recording stations
- 8:30 pm Active acoustic monitoring, netting
- 10:00 pm Return from field

Thursday

- 8:00 a.m. Coffee
- 8:30 a.m. Breakfast
- 9:30 a.m. Return to field site to retrieve overnight data
- 10:15 am Break
- 10:45 am What bat is that?
 - Call plasticity and vocal repertoires
 - Species characteristics of western North American bats
 - Troublesome species
 - Know when to NOT make the call
- 12:00 to 12:30 Hot Lunch
- 12:30 to 3:00 BREAK (Go take a nap)
- 3:00 p.m. Group activity: download and process data from previous night
 - Compile species list from data
- 4:00 p.m. Break (Hors d'ouvres set out)
- 4:20 pm Site selection and recording logistics
 - close, but not in the flight path (to avoid disturbance & interaction)
 - the acoustic environment
 - strong echoes
 - overloading
 - wind and thermal distortion
 - misc. sources of noise
 - foraging or commuting bats?
 - search phase vs. other call types
- 5:00 pm Break
- 5:20 pm Prepare recording equipment
- 6:00 p.m. Dinner
- 7:30 pm Head out to field site to set up recording stations and nets
- 8:30 pm Active acoustic monitoring and netting
- 10:00 pm Return from field

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Friday

8:00 a.m. Coffee, 8:30 a.m. Breakfast and pack a sack lunch

9:30 a.m. Return to field site to retrieve overnight data

10:15 am Break

10:45 am Acoustic study design

setting up a study

What do you want to assess?

study design

sample size

temporal and spatial aspects

analysis

11:30 a.m. Break

11:45 am Break out session- download data from previous night

- begin data analysis

12:15 pm Lunch (packed earlier)

1:15 pm Continue data analysis

- individualized analysis

- compare manual analysis with automated analysis

2:00 pm Break

2:15 pm Compile species lists

- review & troubleshoot

- recommendations for specific monitoring projects

- rare species surveys

- presence/absence surveys

- wind energy

- impact studies

- Final recommendations and participant forum

3:00 workshop concludes