



COLORADO BAT SOCIETY
COLORADO BAT TREND SURVEY
INSTRUCTIONS AND OBSERVATION FORM
WWW.COLORADOBATS.ORG

PURPOSE: To determine general, long-term population trends for Coloradoan bats statewide.

STRATEGY: Conduct at least 10 trend surveys per latilong block annually in June and July.

IMPORTANCE: Although a fifth of all mammalian species are bats (>1,000 species worldwide), the Chiroptera is the least-known order of mammals in Colorado and the most difficult to study because bats are nocturnal, aerial, and many are migratory. Further, bats are particularly susceptible to disturbance because they tend to roost communally, have low rates of reproduction and recruitment, and are widely misunderstood, reputed to be dangerous or worthless. We need to know more about bats, for the bats' sake and our own. Bats may be particularly sensitive to environmental change, including accumulated hazardous chemicals and global warming. Also, in North America, bats are the only major predators of night-flying insects, consuming enormous quantities of many kinds, like mosquitoes and moths.

TECHNIQUE: This survey is a trend survey, similar in some respects to the familiar [Audubon Christmas Bird Count](#). Trend surveys do not attempt to count individuals or to estimate population sizes. Rather, they attempt to establish trends of scarcity or abundance, based on (1) many observations by (2) many individuals (3) over a wide range of habitats (4) made according to a standardized technique.

The last point is critical: the validity of a trend survey depends on adherence by all observers to a standard technique.

Bats are sometimes difficult to distinguish, even in hand. This trend survey is not meant to reveal trends in the abundance of particular species of bats, but of bats in general. Therefore, of observers do not have to be able to distinguish species of bats.

This survey technique is based on a successful, on-going program in Pennsylvania, which utilizes a state-wide network of "Volunteers for Wildlife." (Background information and survey forms are modified from those used in Pennsylvania.) The method makes use of a typical habit of bats in the summer: bats begin an evening's foraging with a drink over still water – a stock pond, tank, or a quiet reach of a stream, for example, which may also be a rich source of flying insects as food. In the weeks prior to the actual survey, each volunteer locates a suitable observation site and confirms habitual presence of bats.

Actual field surveys will take place on two nights during the period from mid-June to the end of July (15 June – 31 July). Beginning an hour before seeing becomes difficult for the observer, each observer will tally the number of bats passing through a fixed plane of reference. For

example, observations might be made over a pond. The observer will count all bat passes (which might be several individual bats or several passes by a single bat) through a vertical plane of sight between the observer and a fixed reference on the far side of the pond – a post, rock, or distinctive tree, for example (See diagram on page X).

The number of bat passes will be recorded for **four consecutive, 15-minute intervals** on each of two **calm** evenings.

All observations at a particular site (a particular vertical plane of reference) should be made by a single individual.

Regional and state coordinators will sum the number of passes by latilong block in annual reports to volunteers, members of the Colorado Bat Society, and the Colorado Division of Wildlife.

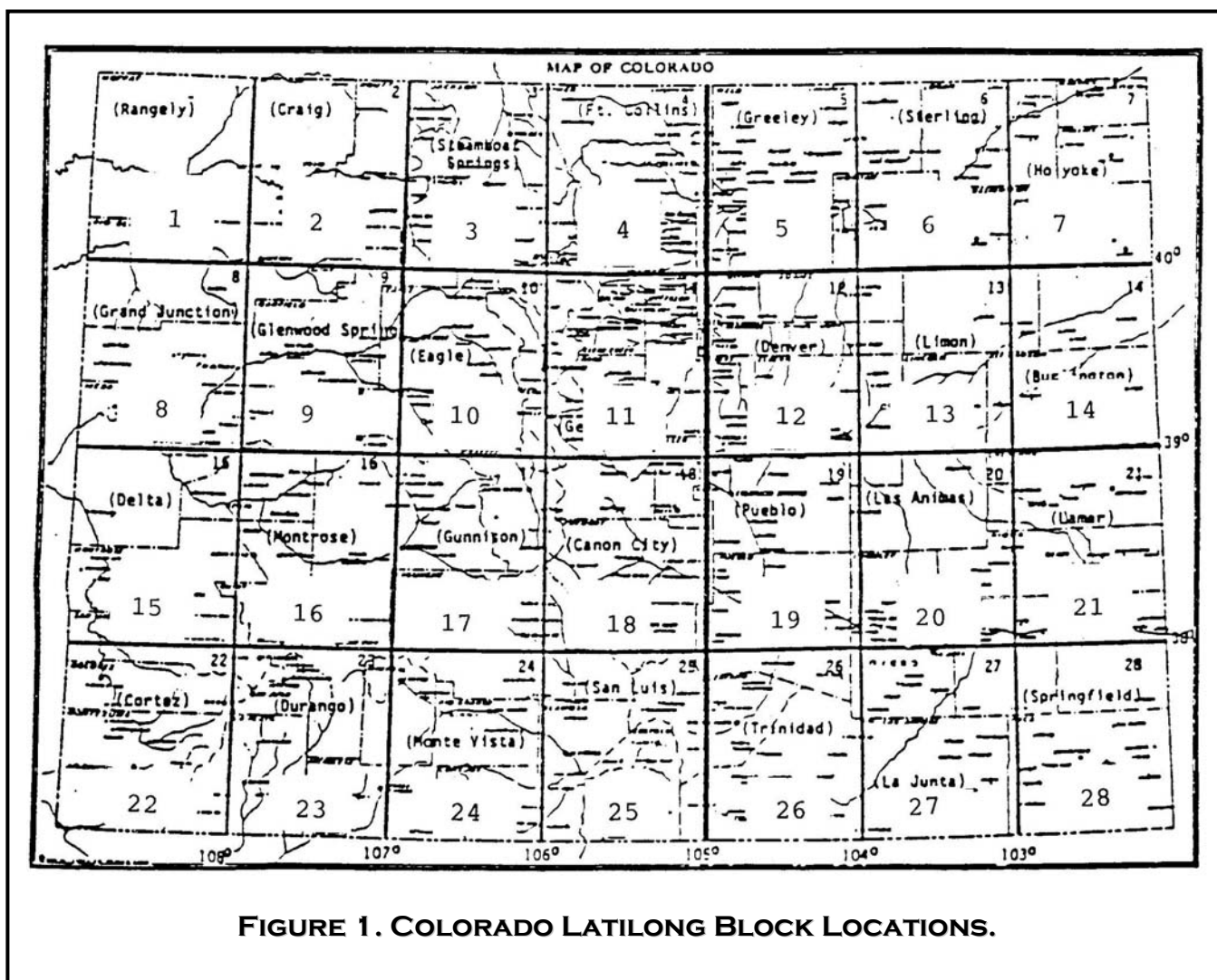
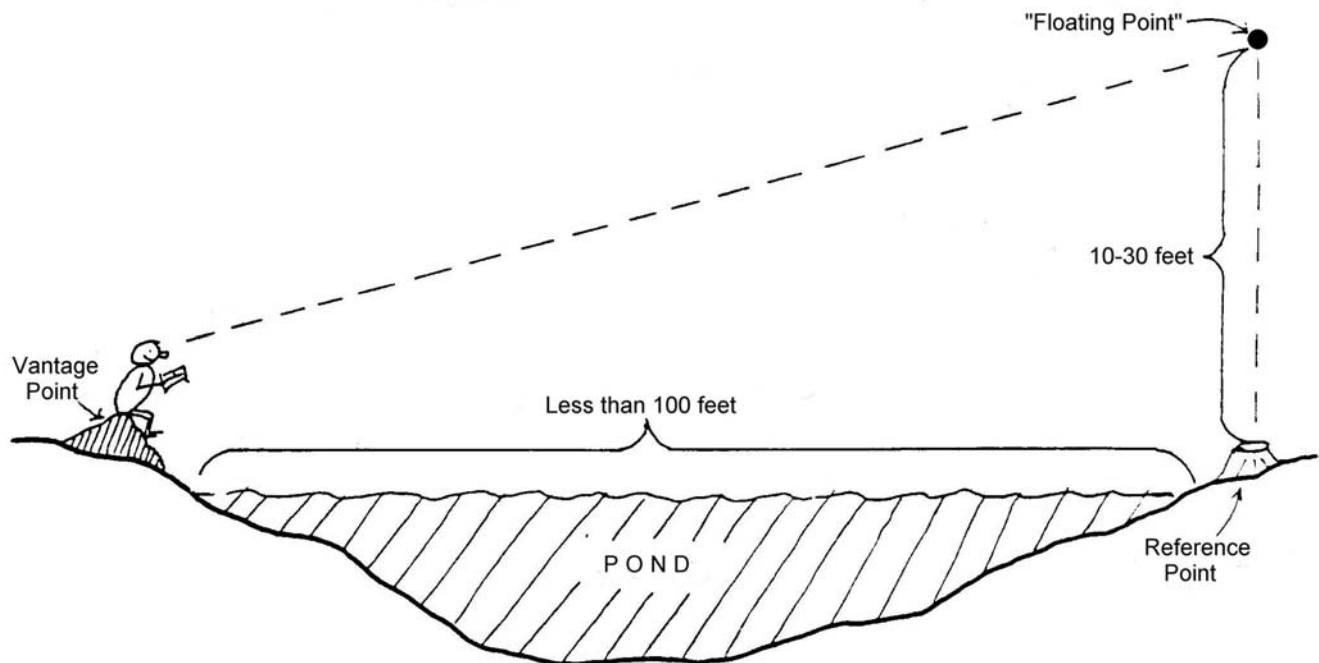


FIGURE 1. COLORADO LATILONG BLOCK LOCATIONS.

BAT TREND SURVEY SUMMARY INSTRUCTIONS

1. Beginning in early June, look for a suitable observation site with obvious bat activity in early evening. Likely sites include stock ponds, large stock tanks (in arid areas), ponds, narrow arms of reservoirs, calm reaches of streams with partial cover of riparian vegetation, etc. Sites less than 100 feet across are most desirable. If on private land, be sure to obtain landowner permission for access.
2. Select a vantage point at the east shore of the lake, pond, or stream. Facing west from the vantage point, select a point of reference (a rock, post, or distinctive tree, for example) on the far side of pond or stream. Think of an imaginary floating point 10 to 30 feet above the reference point. These three points will determine the size and shape (crude triangle) of your vertical plane of reference (see diagram below).



3. It is important to make some trial runs prior to your actual observation nights. Not only will this give you practice tallying bat passes, but you will be able to determine at what time it gets too dark to be sure of seeing all the passes.
4. Select two evenings for actual observations between 15 June and 31 July. Formerly, observers were asked to pick two consecutive nights but this is often not convenient. You may choose consecutive nights, but it is much more important that the weather conditions on both nights be approximately the same. Calm conditions are best. Do not conduct a survey in the rain or when wind speed or gusts are over 18 mph (Beaufort number 5 or higher; Table 2).
5. To the extent possible, enter location, ecological, and weather data on the Observation Record prior to beginning actual observation period. Include enough locality data that another observer could relocate your observation point and your plane of reference.

6. Begin survey **an hour before** the time when it becomes too dark to see the passes easily, as determined on your last trial run (Step 3). If the date of your first actual survey evening is a week or more after the last trial run, you will want to make some compensation in the starting time. Remember that sunset comes later and later until June 21 and then earlier and earlier after that date.
7. Tally bat passes through the imaginary plane of reference for **four** 15-minute intervals. Tally all bat passes, whether several passes of the same individual or passes of several individual bats in either direction.
8. Observations are to be made with the naked eye. Do **not** attempt to use binoculars or a spotting scope. Do **not** use lights as aid to observation or as an attractant.
9. Finish completing the Observation Record, including any informal comments you might want to include on the back of the Record. Submit by August 7th to battings@yahoo.com.

10. **Equipment Needed:**

- a. Patience
- b. Watch
- c. Thermometer (degrees C or F)
- d. USGS topographic map or GPS unit, to record precise locality and elevation
Note: if you use a GPS unit, you must record the datum in which you recorded the coordinates. This is typically found in your unit's settings – WGS1984, NAD83, and NAD27 are the most common.
- e. Insect repellent
- f. Observation Record and clipboard
- g. Tally counter (optional, but handy)
- h. Sense of humor, adventure, etc.

**COLORADO BAT SOCIETY
BAT TREND SURVEY
OBSERVATION RECORD**

Section A: Contact Information

Name: _____
 Mailing Address: _____
 City, State: _____ Zip Code: _____
 Phone: _____ Email address: _____
 Organization Affiliation (if any): _____

Section B: Survey Location

Location: _____
 Lat/Long: _____ Latilong Block (Fig. 1) _____
 Datum (if using GPS unit): _____ Elevation: _____ County: _____
 Habitat (general description): _____

 Habitat Type – point of observation (Table 1): _____
 Habitat Type – general area (Table 1): _____
Estimated dimensions of plane of reference: Length: _____ ft Height of floating point: _____ ft

Section C: Weather

Year _____

	<u>Night #1</u>			<u>Night #2</u>		
	Date	Start Time	Time 1 st bat	Date	Start Time	Time 1 st bat
Temperature						
% Cloud Cover						
Wind Direction						
Wind Speed (Beaufort #-Table 2)						

Section D: Tally of Bat Passes Observed

1 st 15 minutes		
2 nd 15 minutes		
3 rd 15 minutes		
4 th 15 minutes		
TOTALS		

Section E: Tables

Table 1. Habitat Types (from *Colorado Mammal Distribution Latilong Study*, C. Meaney, editor, 1991).

Code	Name/Dominant Vegetation	Some Associated Plants
A- ALPINE		
T	Tundra	
AT	Alpine Transition/ Krummholz Evergreen	
CF-CONIFEROUS FOREST		
LM	Limber Pine	whitebark pine, whiproot clover, juniper
SF	Engelmann Spruce- Subalpine Fir	heartleaf arnica, twinflower, grouse whortleberry, buffaloberry
LP	Lodgepole Pine	kinnikinnick, juniper, buffaloberry, Rocky Mtn. & grouse whortleberry
BC	Bristlecone Pine	whiproot clover, blue-joint reedgrass
PP	Ponderosa Pine	juniper, antelope bitterbrush, mtn. mahogany, fescue, snowberry, side-
DF	Douglas-Fir	mtn. mahogany, snowberry, cliff jamesia, Idaho fescue
PJ	Piñon Pine - Juniper	blue grama, big sagebrush, gambel oak, mtn. mahogany, antelope
S-SHRUBLANDS		
SARB	Sagebrush-Rabbitbrush	(as in Moffat County)
DS	Desert Scrub: Greasewood-Big Sagebrush/Fourwing Saltbush	(as in San Luis Valley)
SA	Big Sagebrush	antelope bitterbrush, needle & thread grass, Idaho & Thurber fescue,
SC	Scrub Oak/ Gambel Oak	mtn. mahogany, snowberry, Utah & Saskatoon serviceberry
MM	Mountain Mahogany	bluebunch wheat grass, needle & thread grass, Idaho fescue, skunkbush
GL-GRASSLANDS		
SGP	Shortgrass Prairie/ Blue grama-Buffalograss	western wheatgrass, sun sedge (as on Pawnee Natl GL)
CG	Cholla Cactus – Blue Grama	galleta, red three-awn, ring muhly, yucca (as in Pueblo County)
SGSD	Shortgrass Semi-Desert/ Grama-Galleta	sand & little bluestem, big sagebrush, fourwing saltbush, loco
MXP	Mixed grasses of habitat alteration areas on Plains (plantings &	side-oats grama, little bluestem
TGP	Tallgrass Plains/ Little Bluestem-Sandsage	switchgrass (as on Yuma Sandhills)
SGM	Shortgrass Mountains/ Arizona fescue – Mtn. Muhly	rubber rabbitbrush, horsebrush (as in San Luis Valley & South Park)
SS	Sand Sage-Yucca Prairie	grama, buffalograss, red three-awn (as on Comanche Natl GL)
MMP	Mountain Meadow & Parkland (wet & dry)/ Tufted Hairgrass	alpine timothy, Parry oatgrass, sedge spp.
R-DECIDUOUS FOREST		
AS	Aspen	snowberry, silvery lupine, bluegrass, Thurber fescue
RPL	Riparian Lowland/ Plains Cottonwood – Tamarisk	snowberry, buffaloberry, wild rye, sedges (<6,000 ft.)
RPT	Riparian Transition/ Narrowleaf Cottonwood – Willow – Alder	Douglas-fir, timothy, sedges, blue spruce (6,000 – 9,000 ft.)
RPH	Riparian Highland/ Willow – Alder	marsh marigold, tufted hairgrass, cinquefoil (>9,000 ft.)
AQ-AQUATIC		
MS	Marshes, bogs, hummocks/ Cattail – Bulrush	may be found in conjunction with lake or reservoir
WOG	wet open ground	alkali & mud flats, gravel beds
RI	Open Water – Streams & Rivers	
L	Open Water – Lakes & Reservoirs	
MISCELLANEOUS		
AG	Agricultural areas	orchards, shelter belts, tree farms, pasture, dwellings, hayfield
CR	Croplands	annual crops incl. wheat, milo, corn, etc.
U	Urban	cities, towns, parks within cities

Table 2. Beaufort Wind Scale

*do NOT survey bats at winds >18mph/Beaufort #5

Number	Windspeed	Description	Observation
0	0-1	calm	smoke rises vertically
1	1-3	light air	smoke drifts slowly
2	4-7	slight breeze	leaves rustle
3	8-12	gentle breeze	leaves & twigs move
4	13-18	moderate breeze	small branches sway
5	19-24	fresh breeze	small trees sway

Section F: Notes
