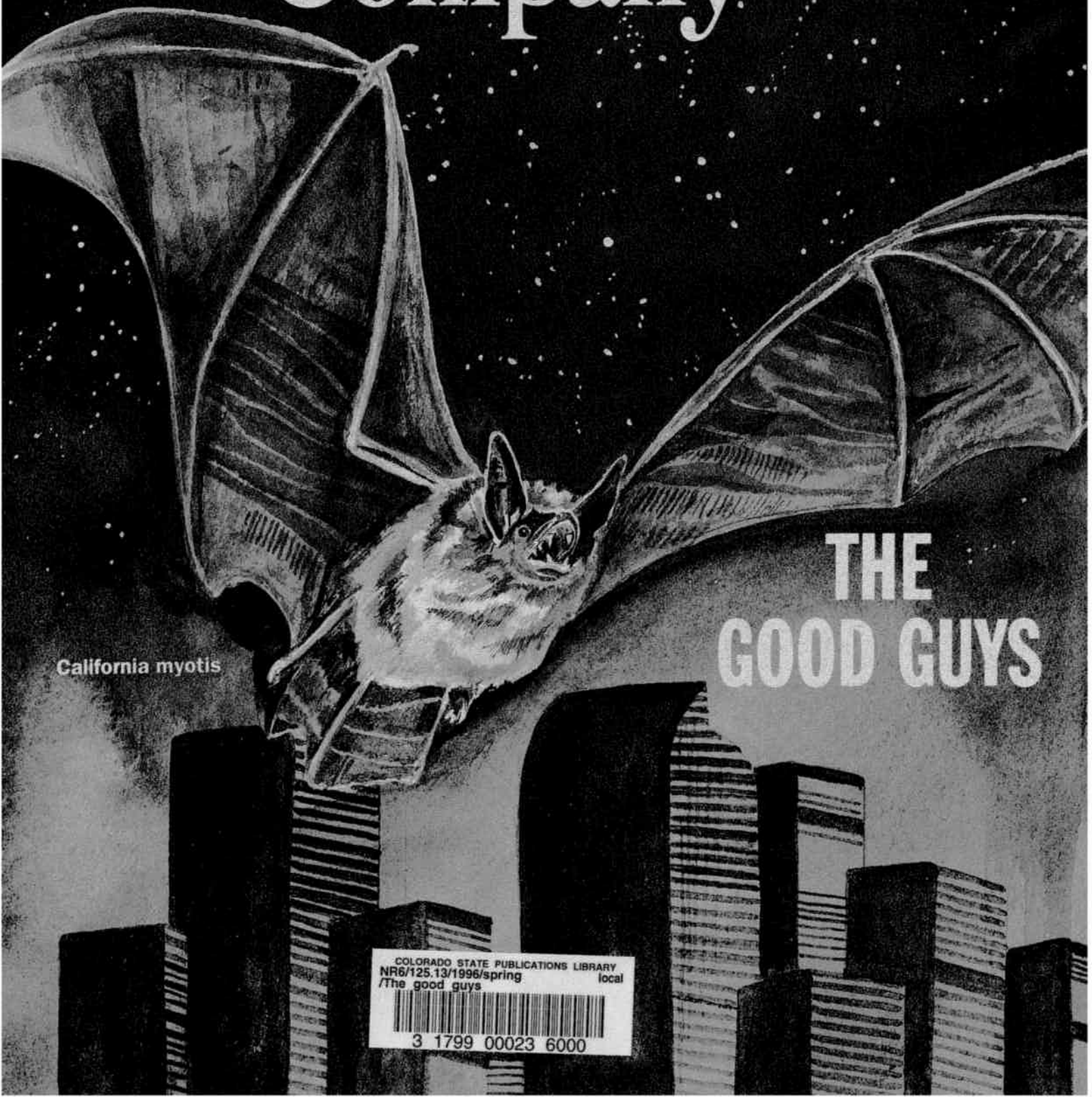


NR 6/125.13/1996/spring  
C.1



1996 SPRING COMPENDIUM OF WILDLIFE APPRECIATION

# Colorado's Wildlife Company



California myotis

## THE GOOD GUYS

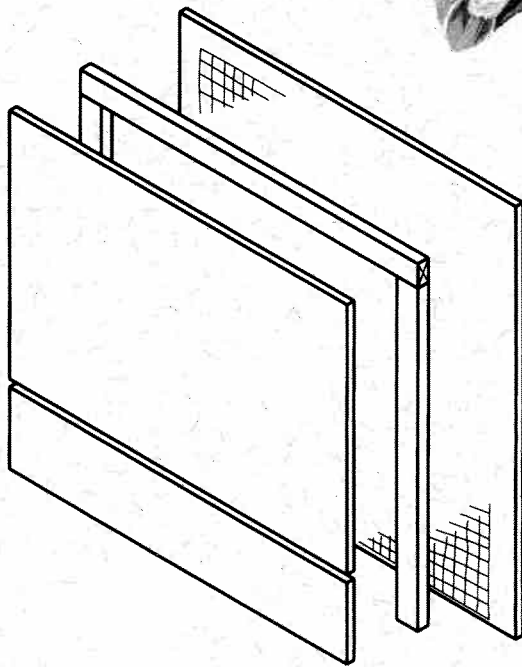
COLORADO STATE PUBLICATIONS LIBRARY  
NR6/125.13/1996/spring local  
/The good guys  
  
3 1799 00023 6000

# Build A Better Bat House!

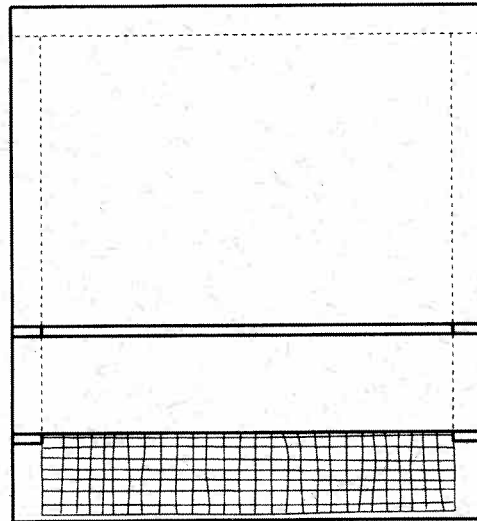
## SMALL ECONOMY BAT HOUSE

### Materials Needed

- 2' by 4' sheet cdx (outdoor grade) plywood
- 8-foot 1" by 2" furring strip
- 20" by 22 1/2" piece of 1/8" mesh hdpe (plastic) netting. Do NOT use metal window screening.
- 30-40 1 1/4" multipurpose (drywall) screws
- 5/16" staples
- 1 tube acrylic caulk
- 1 pint exterior latex paint



exploded view



front view



side view



### Bat Conservation International

*These plans are provided courtesy of Bat Conservation International, a non-profit organization dedicated to bat conservation, bat research and public education. Founded in 1982, BCI works to transform public perceptions about bats, protect threatened and endangered bats and preserve valuable ecosystems.*

*To obtain information and membership information contact Bat Conservation International, P.O. Box 162605, Austin, TX 78716, 1-800-558-BATS (2287)*

## DIRECTIONS

1. Measure and cut plywood into three pieces: 26.5" by 24" (back); 16.5" by 24" (front-top); 5" by 24" (front-bottom)
2. Measure and cut furring strip into one 24" length and two 20 1/4" lengths
3. Screw back to furring strips, caulking first, placing 24" piece first along top, and shorter lengths along sides. Leave bottom open.
4. Staple the netting to inside surface

of back (between furring strips), starting at the bottom. Be sure netting lies flat (curve down) and does not pucker.

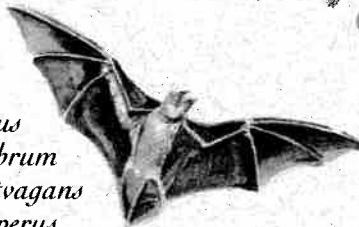
5. Screw front panels to furring strips, starting with top piece and caulking first. Leave a 1/2" vent space between top and bottom panels.
6. Caulk around outside joints if needed to seal roosting chamber.
7. Attach a 4" by 28" board to the top as a roof, if desired.

8. Paint exterior with at least two coats (preferably brown).

Mount the finished house at least 12 feet from the ground, on a pole, wall or tree with a south-facing exposure where it will get six or more hours of direct sun. Bats will only use the house in the summer and can tolerate temperatures as high as 110°. For further information and other bat house options, consult *The Bat House Builder's Handbook*, available from Bat Conservation International.

# COLORADO BAT SPECIES

- Little brown bat - *Myotis lucifugus*
  - Yuma myotis - *Myotis yumanensis*
  - Long-eared myotis - *Myotis evotis*
  - Fringed myotis - *Myotis thysanodes*
  - Long-legged myotis - *Myotis volans*
  - California myotis - *Myotis californicus*
  - Small-footed myotis - *Myotis ciliolabrum*
  - Silver-haired bat - *Lasionycteris noctivagans*
  - Western pipistrelle - *Pipistrellus hesperus*
  - Eastern pipistrelle - *Pipistrellus subflavus*
  - Big brown bat - *Eptesicus fuscus*
  - Hoary bat - *Lasiurus cinereus*
  - Red bat - *Lasiurus borealis*
  - Townsend's big-eared bat - *Plecotus townsendii*
  - Spotted bat - *Euderma maculatum*
  - Pallid bat - *Antozous pallidus*
  - Brazilian or mexican free-tailed bat - *Tadarida brasiliensis*
  - Big free-tailed bat - *Nyctinomops macrotis*
- indicates bats utilizing mines to some degree.  
See DOW working for Wildlife, back page



## Who's Living In Your Bat House?

You can help conserve these remarkable and vulnerable animals by joining BCI's North American Bat House Research Project. By sharing information on the bats using your bat house you can make an important contribution to our understanding of the needs of bats, while sharing in the excitement of scientific discovery. Contact BCI to join.





# BATS Are The Good Guys

by Mary Taylor Gray

With gargoyle faces, night-time habits and a reputation rooted in fear and folklore, bats linger in our collective conscious as beastly creatures of darkness. But contrary to their "bad rep," bats are not only largely harmless, they are beneficial to humans and very important to the ecosystem.

Some tropical species, like flying foxes, can weigh as much as two pounds, but most bats are very small animals, often weighing less than half an ounce, leading to the characterization of them as "flying mice." But bats, of course, aren't mice at all. All bats belong to the mammalian order *Chiroptera*, meaning "hand-wing," just as all rodents belong to Order *Rodentia*. And different bat species are as varied from each other as a beaver is from a pine squirrel.

Bat fossils date back 60 million years, to the time of dinosaurs, and the bats of today don't look a great deal different from their ancient ancestors. Bats are a successful animal group, in fact one fourth of mammal species worldwide are bats. These flying mammals were once extremely abundant, perhaps filling the sky as passenger pigeons did in the last century. But loss of habitat, persecution by humans, pesticide poisoning and other impacts from human activity

all bats roost hanging upside down. If a bat should land on the ground, it lies flat or crawls around crab-like.

People have long watched bats maneuver in the night sky as if blessed with otherworldly powers. Not until the 1930s did scientists begin to realize bats' magic abilities weren't so much supernatural as supersensory. Using high-pitched squeaks beyond the limits of human hearing, bats navigate and locate prey in the dark by interpreting the echoes produced when their calls bounce off objects, a technique called echolocation. Humans hear sounds at frequencies up to 20,000 cycles per second; bats hear up to about 200,000 cps. Even if humans could hear in that range, the idea of locating a creature as tiny as a mosquito strictly by the sound which bounces off its body hints of science fiction. But bats can discern a faint echo at an interval of as little as 1/1000th of a second. Flying with their mouths open, bats emit a constant stream of cries. As the animal hones in on prey, the calls become more frequent — *zot, zot, zot, zzzt*. High frequency sounds work better than low frequency because they can be "beamed" like a searchlight, producing sharper echo-images. Even so, the echoes are extremely faint, perhaps only 1/2000th of the emitted call. Thus bats are basically shouting as loud as they can. Their cries have been measured at 100

Thus it is imperative to not disturb hibernating bats.

Bats have a varied diet. Some eat insects, some eat fruit and some feed on flower nectar. Bats are so important to the pollination of many giant cacti of the desert Southwest, such as saguaro and organpipe, that some of these plants will not produce fruit unless pollinated by bats. Since much Southwestern wildlife is dependent on these desert fruits, bats are key to the survival and interworking of the desert ecosystem.

Eighteen species of bats inhabit Colorado. All are insect-eaters which roost during the day in trees, caves, buildings and rock crevices and hunt in the dark. The little brown myotis, or little brown bat, (myotis means "mouse-eared") weighs only 1/3 of an ounce, yet one individual can capture up to 600 mosquitoes per hour. The big brown bat is one of the most common bats both in Colorado and North America. Because it roosts by day in houses, buildings and bridges, the big brown is the bat species most often seen by city-dwellers.

While big and little brown bats hunt on the wing in what we consider true bat style, pallid bats find food on the ground. Flying close to the ground, their social calls low enough to be heard by human ears, pallid bats listen for the activity of insects. Locating prey, they drop down to eat beetles, crickets and even small lizards and mice.

Some bats roost alone but the Brazilian free-tailed



poisoning and other impacts from human activity have affected bat numbers tremendously. Almost 40% of bat species in America are endangered, making bats North America's most endangered mammal group. Bats are extremely slow-reproducing—most females bear only one young per year—thus bats are very vulnerable to extinction. Perhaps the most graphic example of the downward spiral of bat populations lies with the world-famous Brazilian free-tailed bats of Carlsbad Caverns National Park in New Mexico. Once estimated at eight to nine million, a mere 250,000-350,000 bats now inhabit the caves, a decline of at least 96%.

Bats have not been studied as closely as many mammals and much of their biology remains a mystery, perpetuating a fear of bats rooted in a lack of understanding. The traits and habits bats have evolved to "earn their living" in the natural world make them very different from many mammals. Their most notable skill is the ability to fly. Bats are the only mammals so gifted (flying squirrels actually glide), and they have many physical adaptations for flight. A bat's wing is formed from an elongated forearm and four elongated fingers with a translucent membrane of skin stretched between them. The pelvis is weak and the hind legs are rotated so that the knees point out and back. The structure of the bat's pelvis doesn't allow it to sit upright, thus

as they can. Their cries have been measured at 100 decibels; by comparison, a jackhammer operates at a loudness of about 90 decibels.

Some moths have evolved defenses against echolocating bats; the moths recognize the bats' ultrasonic calls and begin evasive maneuvers. A study found damage from corn earworm moths was reduced by 50% just by playing fake echolocation calls over a test plot. Western spotted bats go the moths one better, using lower-frequency echolocation pulses to hunt moths tuned to higher-pitched sounds.

Bats use other hunting tools as well as echolocation. Big-eared bats listen for the footsteps and chewing sounds of feeding caterpillars and swoop down to pluck the insects off of vegetation. The vision of California leaf-nosed bats is equal to the best night vision scopes, allowing them to see insects feeding on vegetation. Stop-action photography reveals how bats corral elusive prey by cupping their wings and tail membranes to scoop insects towards their mouths.

When winter arrives in the northern hemisphere, bats migrate to warmer climates or find a quiet cave or shelter with constant temperature and humidity and enter a state of hibernation. Hibernating bats are particularly vulnerable; if awakened, a bat may use up 60 days worth of stored fat "revving up" its system. This can result in the animal's starving before the end of winter.

Some bats roost alone but the Brazilian free-tailed bat is not so shy. These bats form colonies numbering as much as 10 million individuals. A mine in Saguache County houses the largest colony of free-tailed bats in Colorado, estimated at 250,000.

"Bats have got to be the best friends of farmers and foresters," says bat expert Dr. Merlin Tuttle, founder and executive director of Bat Conservation International. An Indiana State University study found 150 big brown bats could eat enough cucumber beetles in one summer to prevent the insects laying eggs that would produce 18 million corn root worms, saving farmers \$1 billion a year in insect damage. An enormous colony of free-tailed bats in Texas' Bracken Cave consumes 250 tons of insects per night. The tequila industry, which derives its product from agave plants, is dependent upon bat pollination. Without bats, the probability of successful agave seed production drops to 1/3000th of normal.

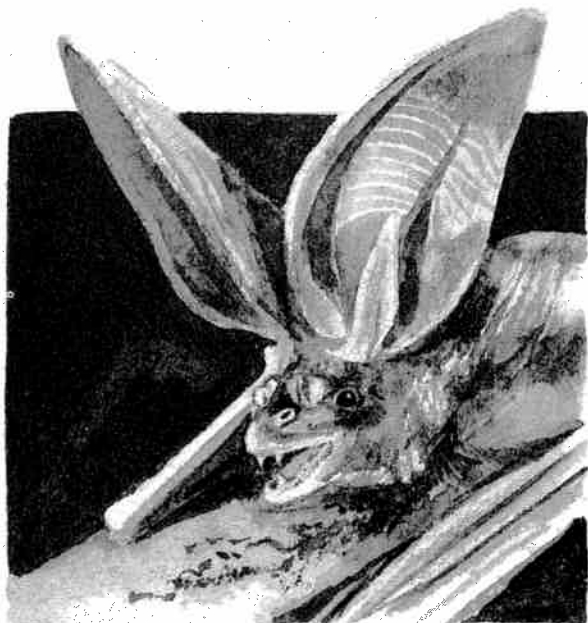
Despite their beneficial activities, bats remain victims of much bad press. Bats do not become tangled in human hair; certainly an animal weighing only half an ounce would avoid another creature 5000 times its size. For all the hysteria over rabid bats, only half of one percent of all bats are rabid. As long as bats aren't handled, the danger of contracting rabies is extremely remote. Public health records from the U.S. and Canada over a 40-year period indicate only 16 deaths from batborne diseases, compared with more than 10 deaths a year from dog bites in the U.S. alone.

There are countless horror stories of bats burned alive, smoked out or entombed in caves by uninformed people who fear bats. Fortunately the public's perception of bats is slowly changing. Evening bat flights, like the departure of half a million Brazilian free-tails from beneath the Congress Avenue Bridge in Austin, Texas, are major watchable wildlife tourist attractions in some places. Appreciation and understanding are the key to protecting these valuable and unique animals. "Bats can live just fine with us," says Tuttle, "If we can learn to live with them."

## A Face Only A Mother Could Love

To human eyes, the faces of many bats are horrific and grotesque, like gargoyles come to life. But the many bumps, folds and ridges found on some bat faces aren't there for show. Most of these structures function during echolocation to deflect or funnel the bat's signals as they bounce off a target, allowing the bat to locate objects above the horizontal plane. Some bats, such as leaf-nosed bats, are named for these facial appendages.

As to the beauty of these ridge-faced bats, it is not only in the eye of the beholder, but also in the sound and scent. Mother bats locate their tiny young by the specific calls and scent of the baby, even amid a nursery colony containing millions of baby bats, sometimes clustered as densely as 500 per square foot. (If bats did admire their babies' facial features, what would they say—"Oh look, honey, he has your mother's nose leaves!"?)



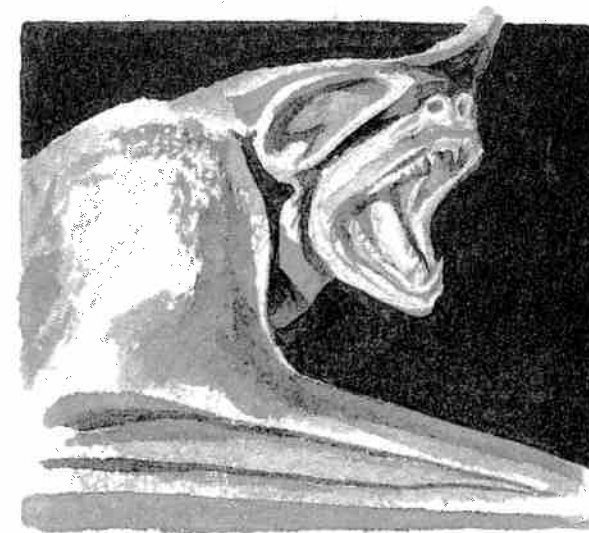
western big-eared bat



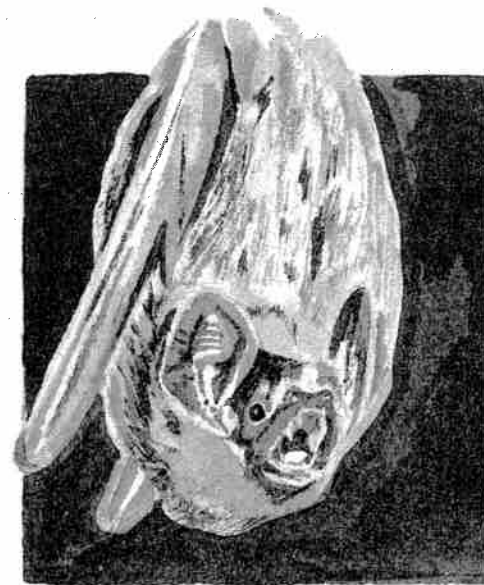
big brown bat



leaf-nosed bat  
(So. California, So. Arizona, So. Nevada)



Underwoods mastiff bat  
(So. Arizona)



hoary bat

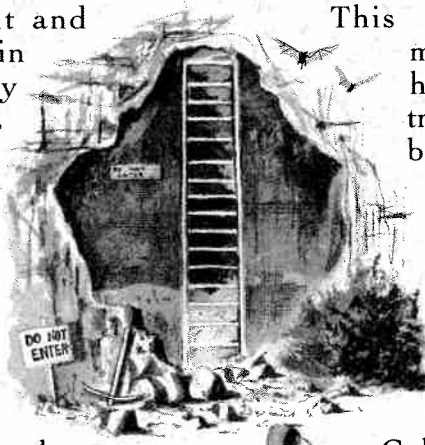


# DOW WORKING FOR WILDLIFE

## The Bats/Inactive Mines Project

As development and human activity in Colorado destroy habitat for bats, these small flying mammals take advantage of habitat created by humans — old mines. Some mines offer constant temperature and humidity and freedom from disturbance for roosting and hibernating bats.

But while some abandoned mines offer refuge for bats, they can be very hazardous for humans, who might fall into hidden mines or enter unstable tunnels. Approximately 400 mines are scheduled for closure annually as safety hazards by the Division of Minerals and Geology of the Colorado Department of Natural Resources. Typical closure methods involve sealing the opening with concrete or rock and/or backfilling and blasting the mine.



This process renders mines safe for humans but is disastrous for bats, either burying them alive or sealing them out of essential habitat.

The solution lies in the Bats/Inactive Mines Project. Each spring and summer, teams of

Colorado Division of Wildlife volunteers hike to the sites of mines scheduled for closure. Without entering the potentially dangerous mines (safety training is required before participating in any surveys), the volunteers survey for bat activity by using bat detectors— instruments that translate a bat's ultrasonic cries into frequencies audible to people. Waiting at the mine entrance in the evening, the surveyors detect bats leaving the mine for their evening hunt. Mines found to have active bat populations are sealed with "bat

gates" (a grid of steel bars or angle iron) instead of solid closures. The gates allow bats to enter and leave the mines without permitting human access.

To date, of nearly 700 mines surveyed, 70 have been recommended for fitting with bat gates, thus protecting valuable habitat for bats. If you would like to volunteer for the program, contact Tom Ingersoll, Bats/Inactive Mines Project Coordinator, 303-291-7501, 6060 Broadway, Denver, CO 80216.

### LETTER TO THE EDITOR

Reader Carol Buchanan expressed concern over a statement in our winter 1995 issue *DOW Working For Wildlife* article *Furbearer Management Plan*—"trapping strictly for the sale of furs or for recreation has been eliminated." She felt it left the impression that "all trapping is focused on animal damage management."

The intent of the Furbearer Management Plan is to focus trapping on animal damage management, but it does not preclude the sale of furs. The plan means to eliminate trapping for which the primary or sole intent is recreation or the sale of furs.

Colorado's Wildlife Company; published quarterly; mailed free of charge. Publication paid in part by donations to the Nongame & Endangered Wildlife Fund. Permission granted for reproduction for educational and non-commercial uses only, with credit to writers, illustrators, Colorado's Wildlife Company, and the Colorado Division of Wildlife. Printed on 75% recycled paper. Send letters to the editor c/o Mary Taylor Gray, Editor; P.O. Box 37351, Denver, CO 80237.

STATE OF COLORADO  
Roy Romer, Governor  
DEPARTMENT OF NATURAL RESOURCES  
James S. Lochhead, Executive Director



COLORADO DIVISION OF WILDLIFE  
John Mumma, Director  
6060 Broadway  
Denver, CO 80216

 Nongame and Endangered  
Wildlife Program

 Watchable  
Wildlife Program

RECEIVED

APR 03 1996

STATE PUBLICATIONS

Colorado State Library  
DROCKER, MAUREE  
STATE PUBLICATIONS DEPOSITORY  
201 E COLFAX, ROOM 314  
DENVER 80203

Bulk Rate  
U.S. Postage  
PAID  
Denver, CO  
Permit 1533