

# BATS!

Who They Are, Where They Live,  
and Who They Benefit!

Meg Lunnum

**HAPPY VALLEY**  
**BATS**



**BATS NORTHWEST**

# Agenda:

- Introduction
- One
  - World Bats
- Two
  - Pacific Northwest Bats
- Three
  - Building for Bats
- Questions – you can use the chat to ask questions.

- Started as a volunteer at Sarvey Wildlife Care Center
- Received WDFW permit in 2003
- Training
  - Online and hands-on
- Attend various workshops and symposia
- Northwest Veterinary Clinic – Stanwood
  - Dr. Steve Boskovich

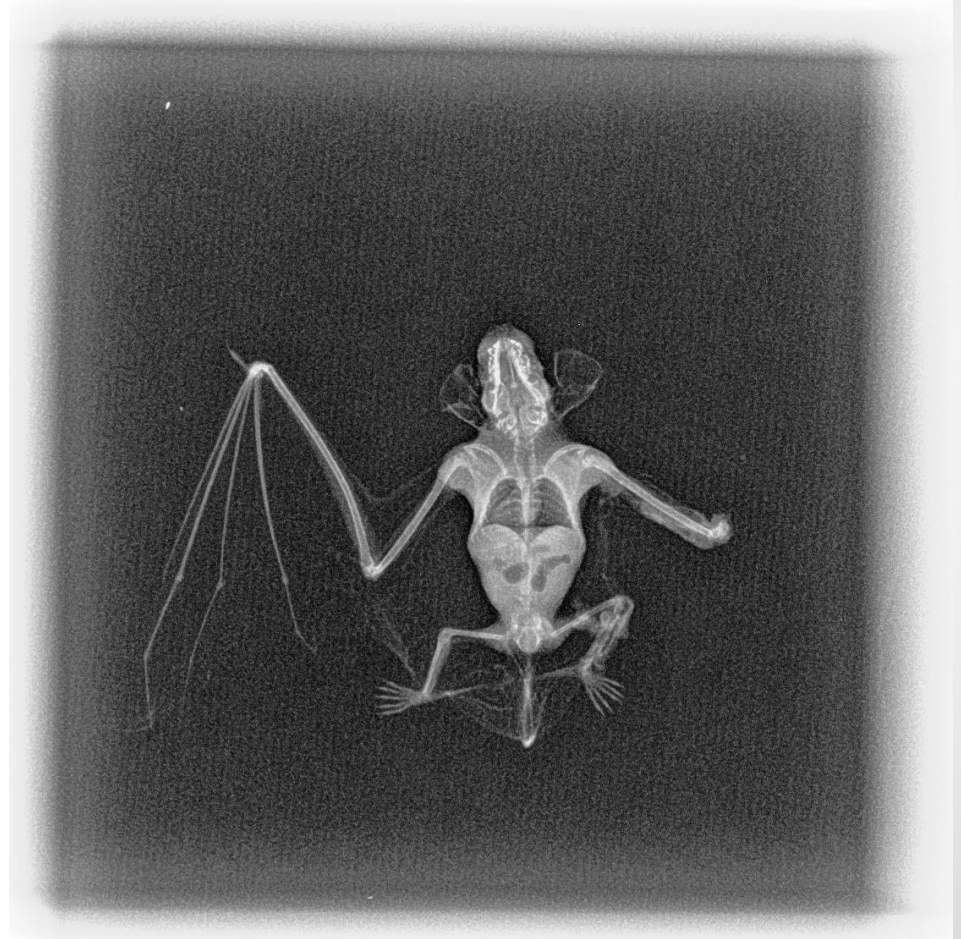


- Principle veterinarian for Happy Valley Bats
- Whole staff is accepting of bat care

# Bob, the bat



Silver haired bat  
*Lasiurus noctivagans*



# One: World Bats

- Natural history
  - ~~1,300+~~ species
  - Variety of food
  - Pollinators
- Bat Myths
  - Bats in your hair
  - Vampire bats
  - Are bats blind
- Diseases
  - Rabies
  - SARS-CoV-2

1,411+

New species found in West Africa  
in the last few weeks.



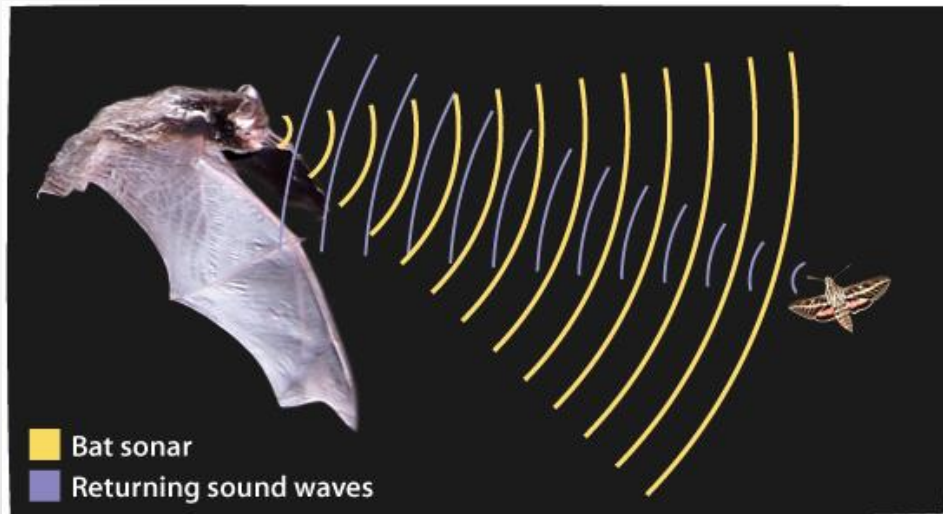
*Myotis nimbaensis*

- **Megachiroptera**

- Old World bats – flying foxes
- Use eyes to find food

- **Microchiroptera**

- Small, insect eating bats
- Use echolocation to forage

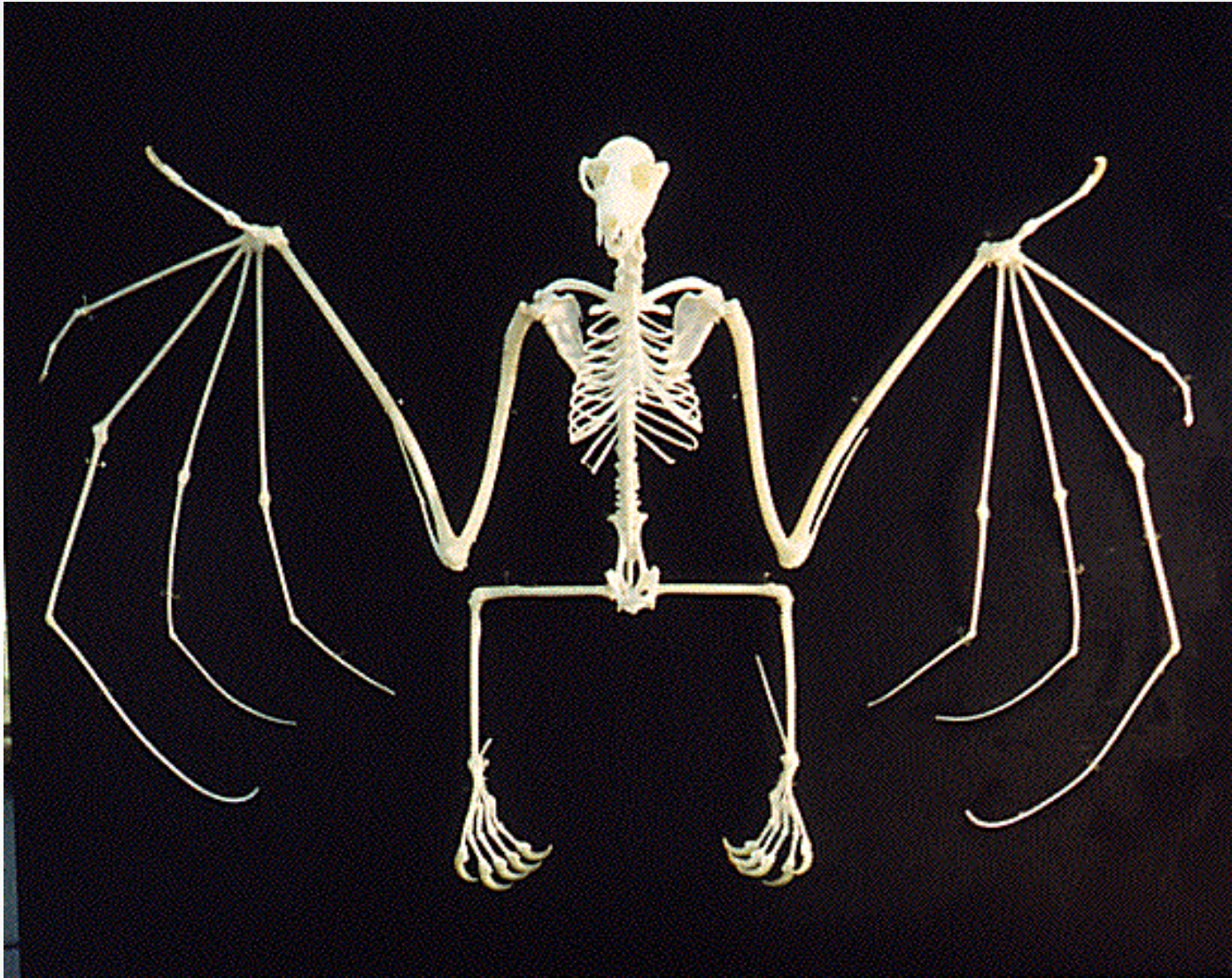


# Natural History

- Only flying mammals
- Bats – Order: Chiroptera (hand wing)
- Insects, fruit, pollen, nectar, frogs, birds, or other bats, blood, fish
  - 80% eat insects
  - 3 species of vampire bats



- Bats are found everywhere except the Antarctica and the Arctic





# Greater Bulldog bat or Fisherman bat

*(Noctilio leporinus)*

- Uses echolocation to find fish
- Uses tail membrane to scoop up fish, then grabs with sharp claws



Each bat has something special



# Bats as pollinators

- Cave bat with banana
- Bats pollinate eucalyptus for koala bears



- No bats, no tequila...
- Over 300 species of fruit depend on bats for pollination
- Fruit eating bats also are seed dispersers

# Bat Myths



Do bats get in your hair?

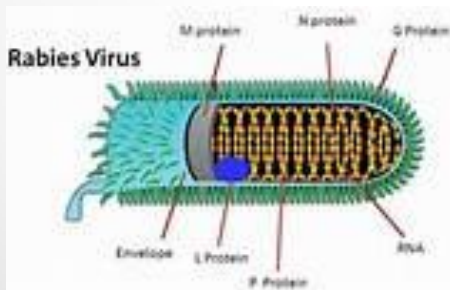


Do vampire bats bite your neck and drink your blood?

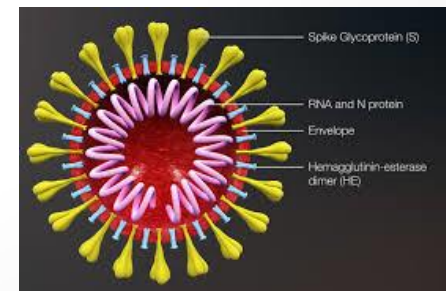


Are all bats blind?

Do all bats have rabies?



Do all bats have coronavirus?



# RABIES

- Primary reservoir of rabies in the Northwest is bats
    - Less than 1% of native wild population has rabies
  - You must never touch a bat with bare hands – especially if you find it on the ground or if they have been hanging in the same place for a few days
    - You can't tell if the bat has rabies just by looking
  - Any mammal can contract rabies from the bite of an infected animal - **A rabies infection is fatal**
  - Make sure your children understand that picking up a bat or touching a bat is dangerous
  - Kids need to notify an adult if they find a bat that is within their reach
- \* Bats are wild animals and may bite in self-defense \***

# What to do if you think you have had contact with a suspected rabid bat?

- Be informed, check out the CDC or [wa.doh.gov](http://wa.doh.gov)
- Contact county/state health departments about possible exposure
  - Exposure could be a bat found in the room of a sleeping child or an incapacitated adult
- Your county health department will test the bat and make arrangements for post-exposure vaccinations if needed:
  - Treatment is a series of shots. These shots, called post-exposure prophylaxis (PEP), include one dose of human rabies immunoglobulin (HRIG) and four doses of rabies vaccine given on a specific schedule over a 14-day period.

# Hiding in plain sight...



# Two: Pacific Northwest Bats

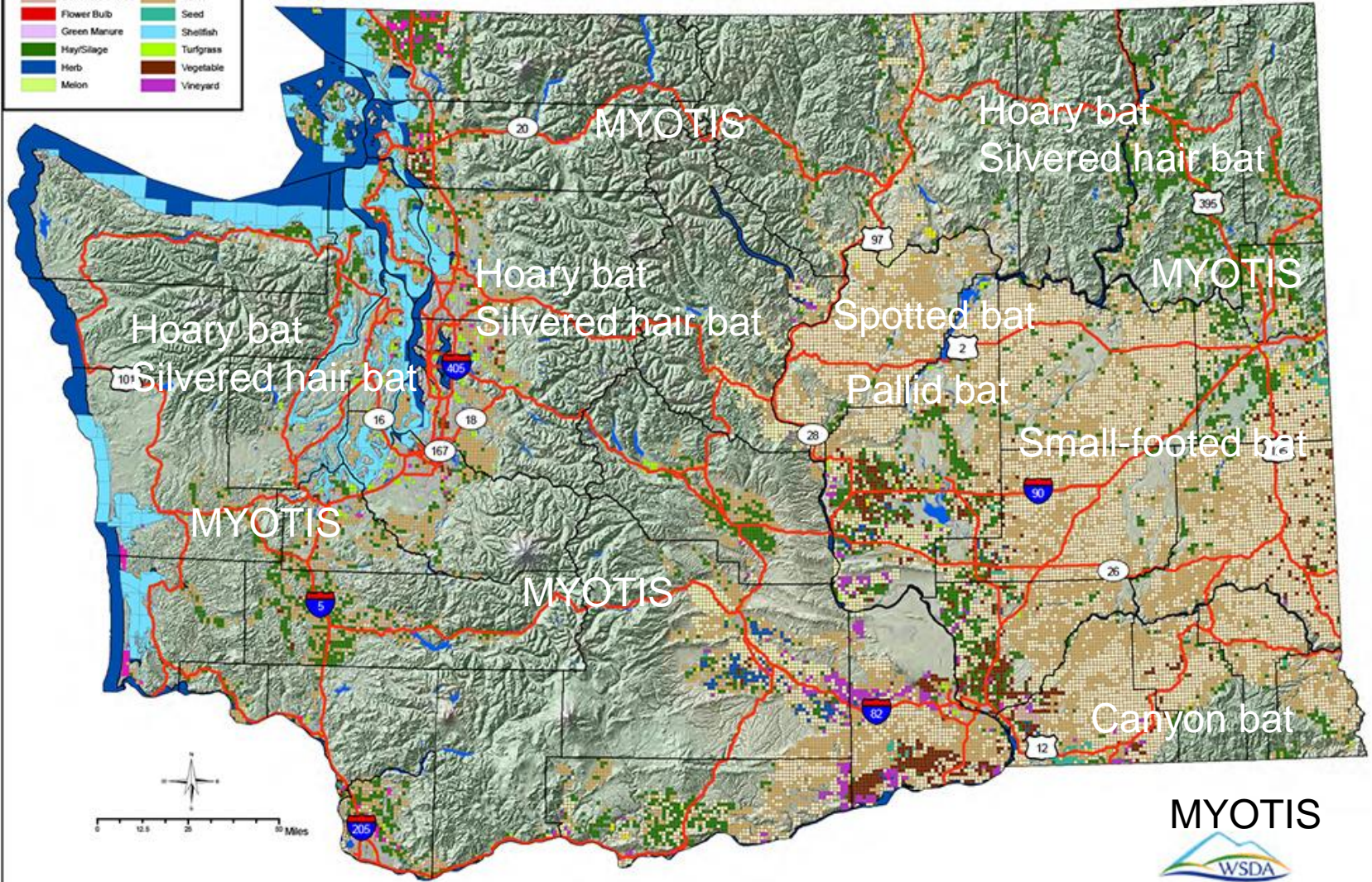
- Natural History
  - 15 species in our state
  - White Nose Syndrome
- What do bats eat
- Where do bats like to live
- Why bats like to live in your attic or roof
- What do bats do in spring, summer, fall and winter



# 2015 Washington State Agricultural Land Use

## Legend

Crop	
	Berry
	Cereal Grain
	Flower Bulb
	Green Manure
	Hay/Silage
	Herb
	Melon
	Nursery
	Oilseed
	Orchard
	Other
	Seed
	Shellfish
	Turfgrass
	Vegetable
	Vineyard



Scale 1:2,250,000  
 Natural Resources Assessment Section  
<http://www.agr.wa.gov/PestFert/naturalresources/AgLandUse.aspx>  
 Perry Beale, March, 2016

References for outside source crop data:  
 Conservation Districts  
 National Agricultural Statistics Service (NASS) CDL  
 Washington State Department of Health (DOH)

This map represents data collected and generated between 2002 and 2015. The dominant crop (by acres) in each section of land is shown. This product is provided 'as is' without warranty of any kind, either expressed or implied, including, but not limited to, the implied warranties of merchantability and fitness for a particular use.

# Pacific Northwest Bat Natural History

- Nocturnal feeders, roost during the day
- Crevice bats and foliage bats
- Colonial and solitary bats
- 15 species in Washington
- Most local bats hibernate or migrate
- Some species spend the winter and are active
  - California myotis
  - Silver haired bat
- Most often seen:
  - Little brown bat
  - Yuma myotis
  - Big brown bat
  - Pallid bat – East side
  - California myotis

Our bats only eat:

**INSECTS!!!**



# Insectivorous – insect eating bats

## Aerial hawkers and netters

- Echolocation is used to detect insects
- Scoop small insects into tail membrane
  - Eat on the fly
  - Water Hunters



## Gleaners

- The Pallid bats eat scorpions and centipedes
  - Seem to be immune to the stings and bites
- Live on the dry side of the state

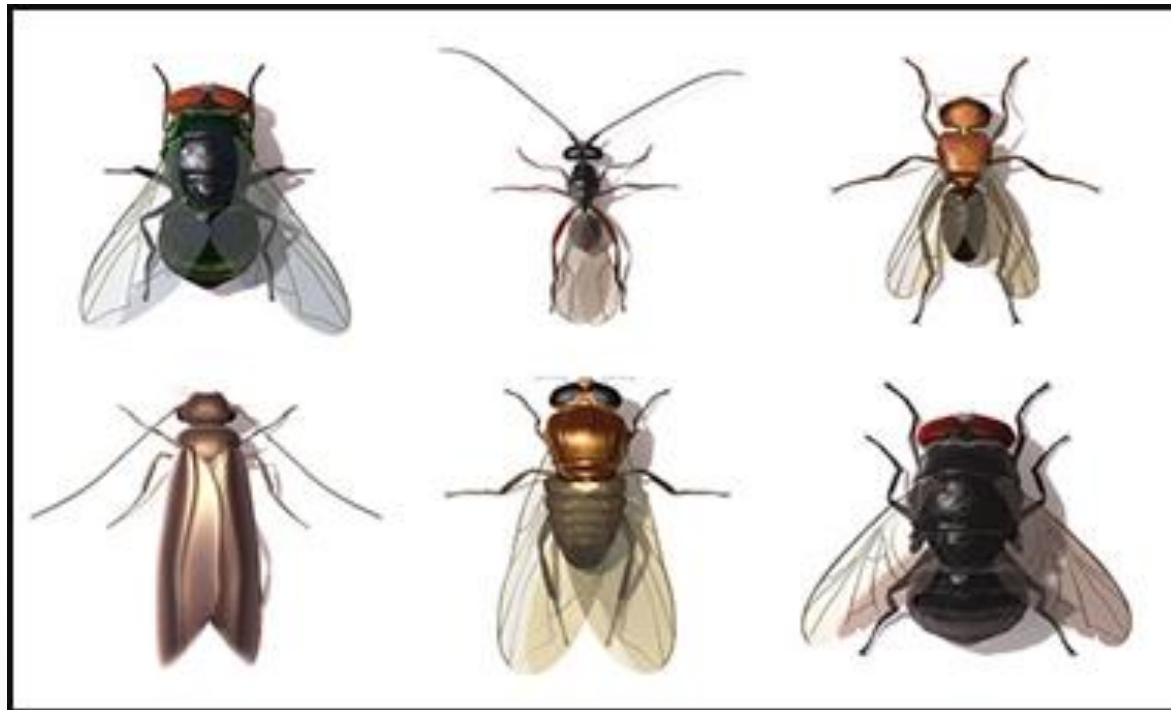


# What Bats Eat...

- Moth specialists
  - Townsend's big eared bat
  - Western long eared bat
  - Fringed bat
  - Long-legged bat
  
- Beetle specialists
  - Big brown bat
  - Silver-haired bat
  - Hoary bat



- Fly, midge, and mosquito specialists
  - Little brown bat
  - Yuma bat
  - California bat



# Eastside Bats

- Pallid bat – *Antrozous pallidus*
  - Second largest bat
  - Hanford and Yakima Training Center
  - Gleaning bat – ground dwelling arthropods
    - Crickets, scorpions, small lizards/mammals
    - Flower nectar from Agave



- Spotted bat – *Euderma maculatum*
  - Sun Lakes, Moses Coulee, along Columbia River
  - Forage over hay fields, golf courses
    - Can commute 3 – 6 miles to forage
    - Eats noctuid moths
      - Larvae are cutworms/armyworms



- *Myotis ciliolabrum* – Small footed bat
  - Eastern Washington –
    - Foothills of the Cascades
    - Idaho border
  - Hibernate close to where they live during the summer
  - Eat moths, caddisflies, true bugs



- *Parastrellus hesperus* – Canyon bat
  - Southeast corner –
    - Blue Mountains
    - Snake River
  - Non-migratory, may be active in the winter
  - Eat swarming insects
    - Midges and gnats



# Big Brown Bat – *Eptesicus fuscus*

- Large bat
  - 4" – 5" head to toe
  - 14" wing span
- Roost
  - Under loose bark, in attics, behind window shutters and in bat houses
- Eat
  - Beetles, wasps, other flying insects

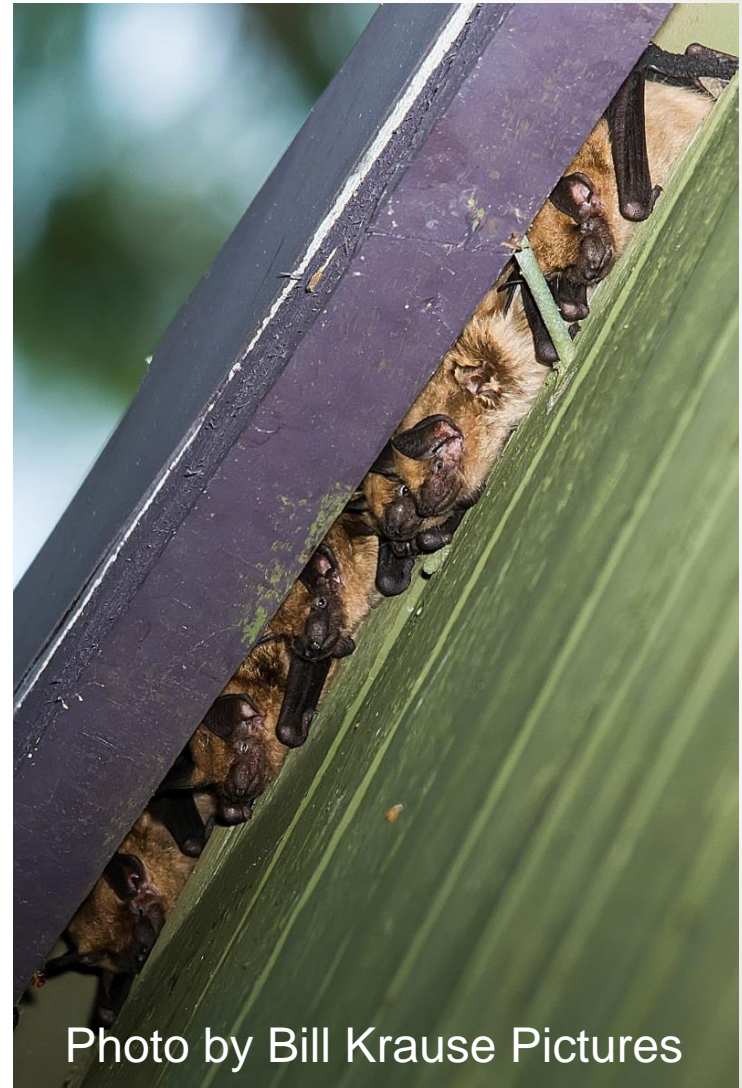


Photo by Bill Krause Pictures



Big Brown Bat (*Eptesicus fuscus*)  
leaving its roost

Bill Krause Pictures

# Little Brown Bat – *Myotis lucifugus*

- Small bat
  - 3" – 3 ½" head to toe
  - 6" – 8" wing span
- Especially associated with humans
  - Forming nursery colonies of hundreds of bats in attics and bat houses
- Can catch up to 1,200 insects in an hour



# Hoary Bat – *Lasiurus cinereus*



- Big bat
  - 4" – 6" head to toe
  - 19 – 37g
- Roost
  - Dense foliage and leaf litter
- Bears twins
- Eats
  - Moths, grasshoppers and termites
- Only bat in Hawaii

# Hoary Bat



# California Myotis



- Small bat
- Spends the winter
- Roosts
  - Crevices in tree bark and rocks, buildings and bridges
- Forage before dark
  - Moths, flies and termites
- Hibernates in wood piles and eaves of your house

# Long-eared myotis – *Myotis evotis* (*Myotis evotis keenii*)



- Ears
  - $\frac{3}{4}$ " long, fold over past nose
- Move from shake shingles to a bat house
- Eats
  - Moths



# Townsend's big eared bat

## – *Corynorhinus townsendii*

- Ears
  - 1 ½" long
- Eats
  - Moths, spiders
- Tiny body
  - 3 ½" to 4 ½" head to toe
- Roost/hibernate
  - In caves and mines, also buildings



**Classified as state candidate species – needing conservation.**

# Silver haired bat – *Lasionycteris noctivagans*

- Hibernates locally in wood piles
  - Migrates
- 2” – 4” head to toe
- 12” wing span
- Eat
  - Crane flies, mosquitoes
  - Beetles
- Usually bears twins





# Yuma bat and Fringed myotis

- Day/Night roosts
  - Porches, building and under bridges
- Hibernation
  - Caves on the coast
- Pup – born during June



- Larger small bat
  - One of 3 similar long-eared bats
- Roosts
  - Buildings, rock crevices
- Eats
  - Moths, spiders, leaf hoppers



Mother bats find their babies by smell and sound

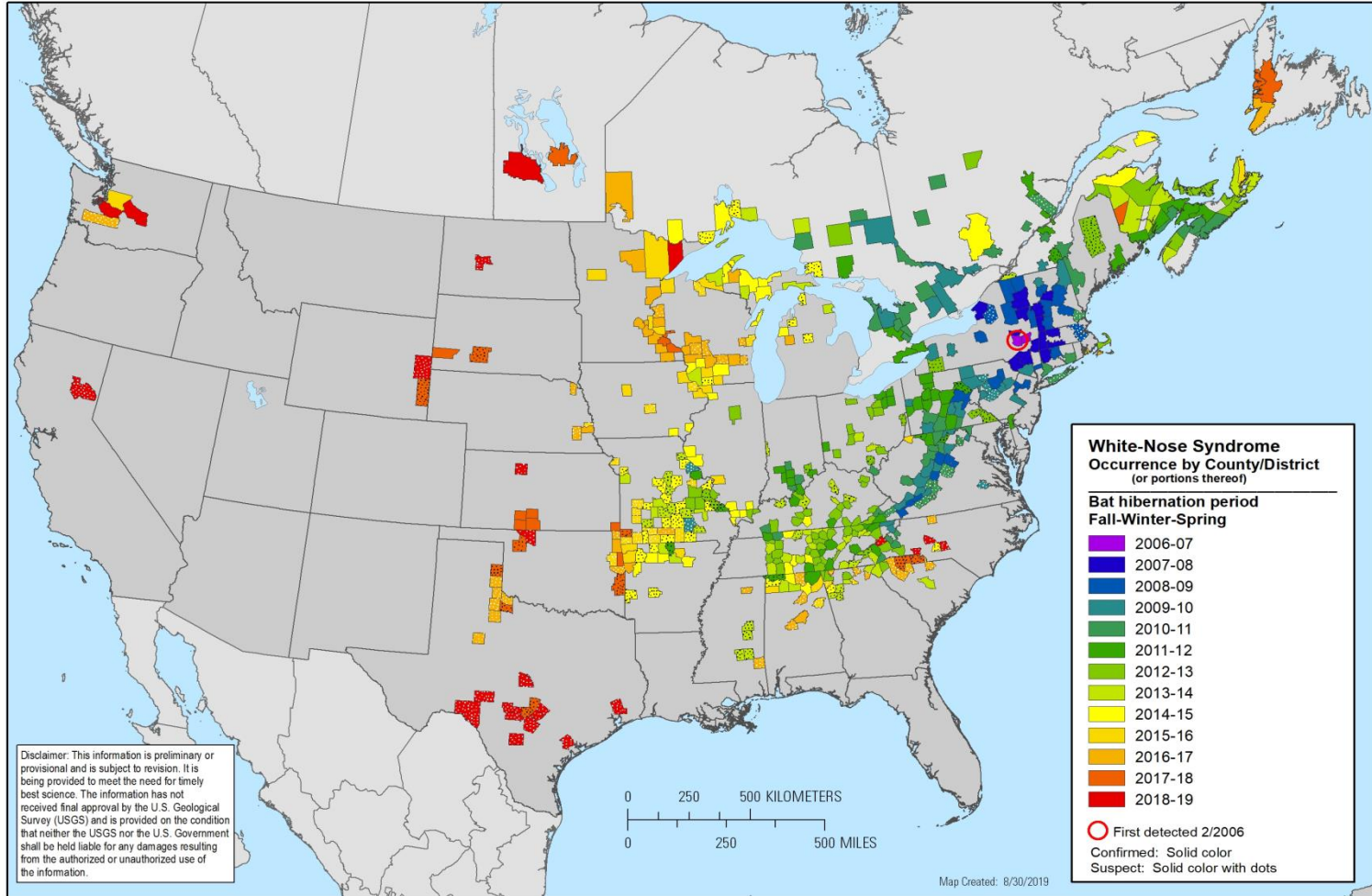
# What do bats do?

- Fall
  - They make sure there are new bats
  - Mate in the fall at hibernation sites
    - Female holds sperm viable until the spring is warm enough for foraging
- Winter
  - Hibernate or migrate or stay
    - California bats hang around all winter
    - Silver haired bats will be in your wood pile
    - Myotis can migrate up in elevation to talus slopes

# White Nose Syndrome

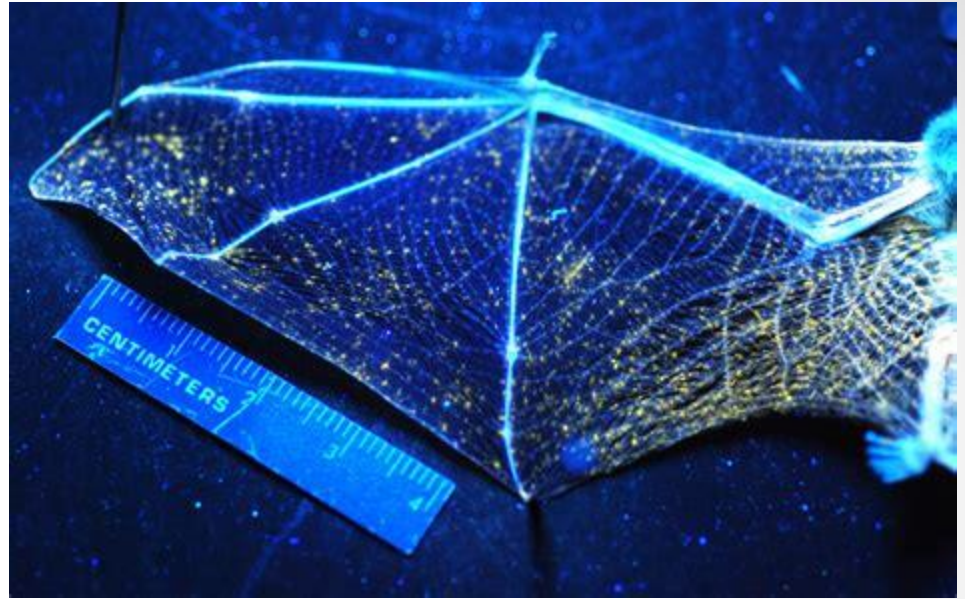
- Fungus
- New York –
  - Winter of 2006-2007
- Killed more than 5.7 million bats in eastern North America
- White fungus on muzzles and other parts of hibernating bats
- *Pseudogymnoascus destructans* or pd.





Citation: White-nose syndrome occurrence map - by year (2019). Data Last Updated: 8/30/2019. Available at: <https://www.whitenosesyndrome.org/static-page/wns-spread-maps>.

# Washington State



- March 2016
  - Bat on the ground found close to North Bend, WA
  - Taken to PAWS
  - Discovered to be infected with pd, bat died.
  - Silver haired bat submitted for rabies, had pd on body but not infected
  - Bat Guano found under bridges in the North Bend area

# Washington Bats Need Your Help

- Report your bat sightings
- How does WNS affect bats
  - Fungus on outside of bat but goes away with arousal
- Fungus can invade deep skin tissues -wings and body.
- Can die from wing damage, inability to regulate body temperature, breathing disruptions and dehydration.
- <https://wdfw.wa.gov/species-habitats/diseases/bat-white-nose>

# What do bats do?



- Spring
  - Return to the area in March or April
  - Birth – May, June or July
  - Find a hot spot for a maternity colony
    - Your attic – 85 to 104 degrees F
    - Speeds development of pups, during fetal development and after birth
  - Pups unable to fly for month, left in nursery while mom hunts
  - May return to exact location year after year
- Males roost alone or in small groups



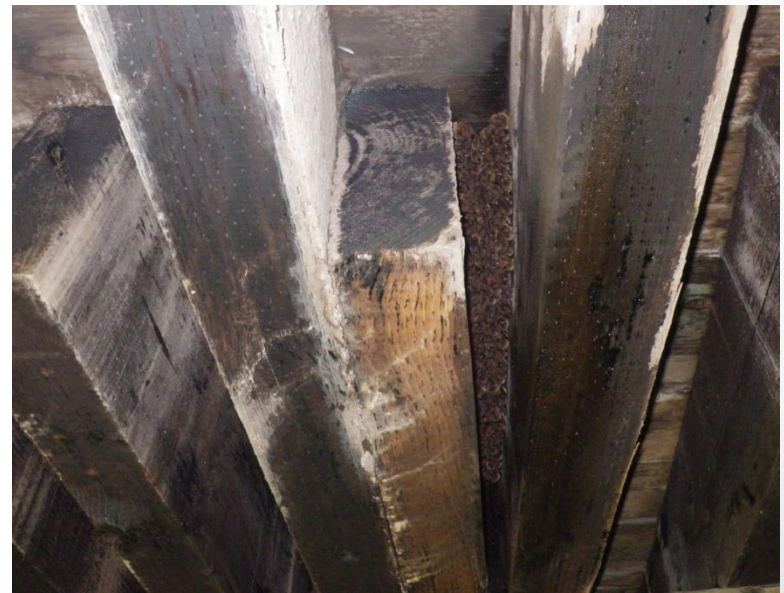
# Summer

- Eat lots of flying insects
- Myotis = one pup
- Tree roosting bats = two to four pups
- Big brown = one pup



**~3,000 adults Yuma & Little brown bats give birth and raise their young in the 2" wide gaps under the beams.**

# Where they hang out...



# Bats roost anywhere...



# FLY PAPER OR STRIPS

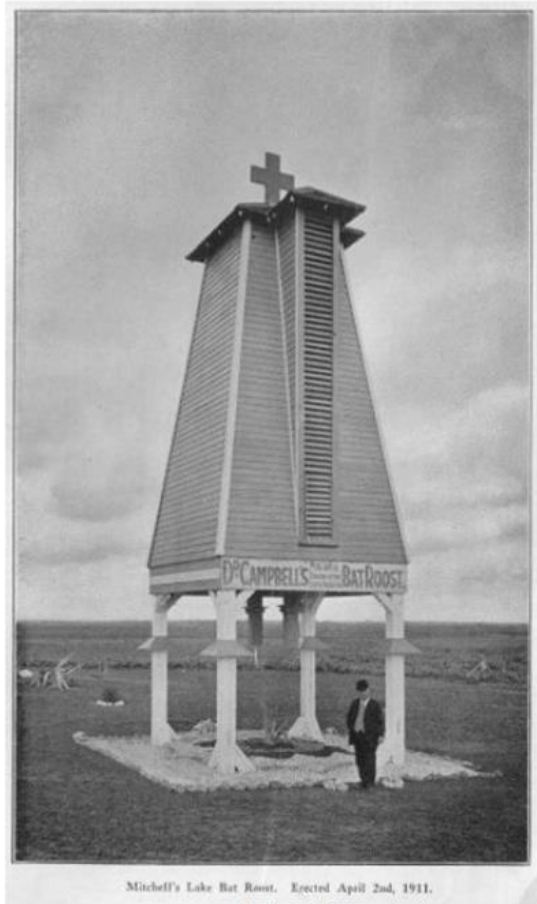


- ✓ Bats can get caught in sticky fly paper
- ✓ They struggle and get caught up even more
- ✓ When they groom off the goo, they can get poisoned from insecticides
- ✓ Call a wildlife rehabilitator if you find any wildlife in a sticky fly trap
  - ✓ Can be birds or snakes



- ✓ **Enclose your fly strip or fly paper in a wire cage**
- ✓ **Chicken wire is easy to use**
- ✓ **Form it around the sticky strip and hang it up**

# Provide roost habitat



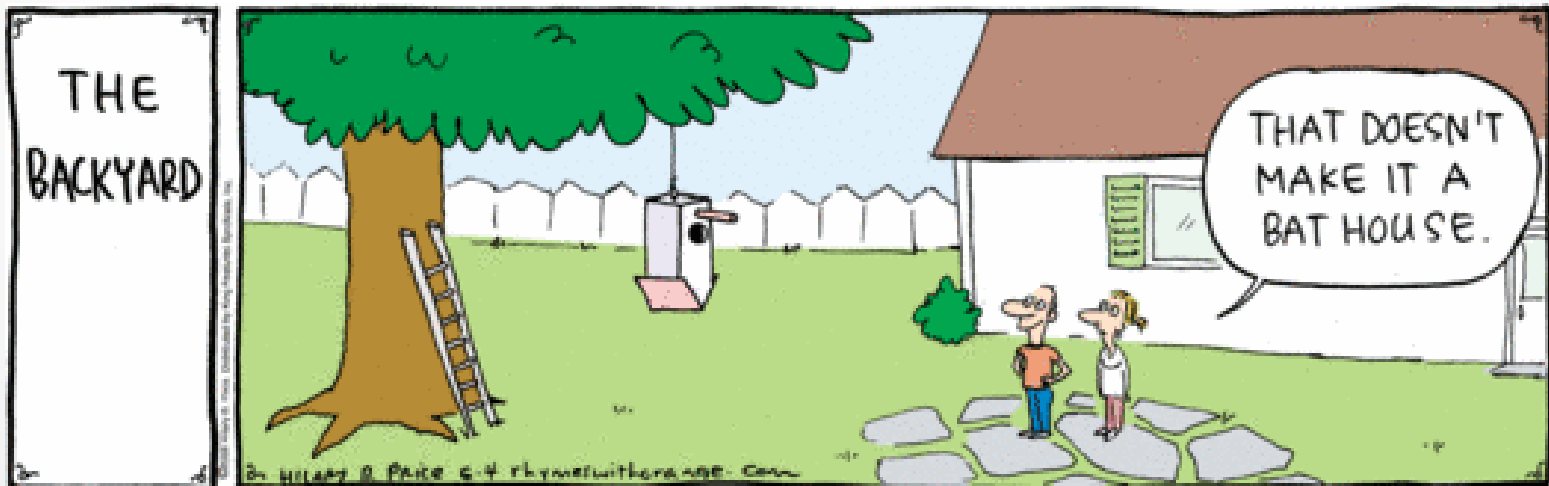
*Figure 1*

Dr. Campbell's Texas bat house  
(1911)



# Three: Building for Bats

- Conflicts and exclusions
- Bat Houses



This might be the way bats are getting  
into your attic...





# Preventing conflicts...

- Bats do not gnaw holes in walls, chew electrical wiring, shred material or cause structural damage
- Observe to find if bats are the cause
  - Bat droppings - bats defecate before entering roosts, you may find droppings
  - Bat sounds – Squeak before leaving roost
    - Pups will squeak continuously when separated from their mothers
  - Bat odors – scent glands and guano
- <https://batmanagement.com/blogs/bat-exclusion-control>

# Excluding bats...

- Humane exclusion is safest for all
  - Never trap flightless young bats or adult bats inside a structure
  - Traps can be fatal
  - Relocation is not recommended
    - Yuma myotis returned from 240 miles away
- Provide an alternate roost site
  - Properly designed and installed bat house
    - Mount close to one of their exits
  - Install bat house before doing exclusion

# Build bats out...

- Mid-August to mid-October
- If bats are present, use a one-way screen over main entry
  - Plug smaller holes and leave just one escape
- Count bats
  - Leave hole open for several days
  - On the last night of final count, main hole can be plugged
  - Open again the next night to be sure there are no bats before sealing
- Mid-October to mid-March or, make sure there are no bats
- Seal all potential entry holes
  - Large openings can be sealed with aluminum flashing, wood or hardware cloth
  - Small holes can be stuffed with window screening, fiberglass insulation, steel mesh
  - Around doors, windows, vents use weather-stripping, caulk or expanding foam

# Harassment...

- Before birthing in May
- Mid-August to mid-October
  - Bats are present after pups learn to fly
- Bats don't like bright, windy or noisy conditions
  - Shine a bright light on roost
  - Aim a fan at roost
  - Loud radio
  - Also cover roost with aluminum foil
- Temporary roosts above porches
  - Nontoxic sprays designed to repel dogs and cats
  - Strips of aluminum foil hung from porch ceiling or mylar balloons

# If you need to capture a bat...

- Cover with a container, plastic bowl or small box with lid of some type
  - Slide piece of cardboard or lid of the container up wall until bat is in container and lid on
  - If no one touched the bat, it can be released outside
  - Make sure you put the bat up high



# Bats as gardening buddies

- All natural pest controllers, one bat is capable of consuming more than 500 night-flying insects in a single hour.
- Mosquitoes, leafhoppers, cucumber beetles, flies and moths.
- As an added bonus, bats provide nutrient rich fertilizer in the form of bat guano with high levels of phosphorus and nitrogen.
- How do you attract bats? Build a bat house
- Plant insect friendly plants.

# BAT PREFERRED HOUSES



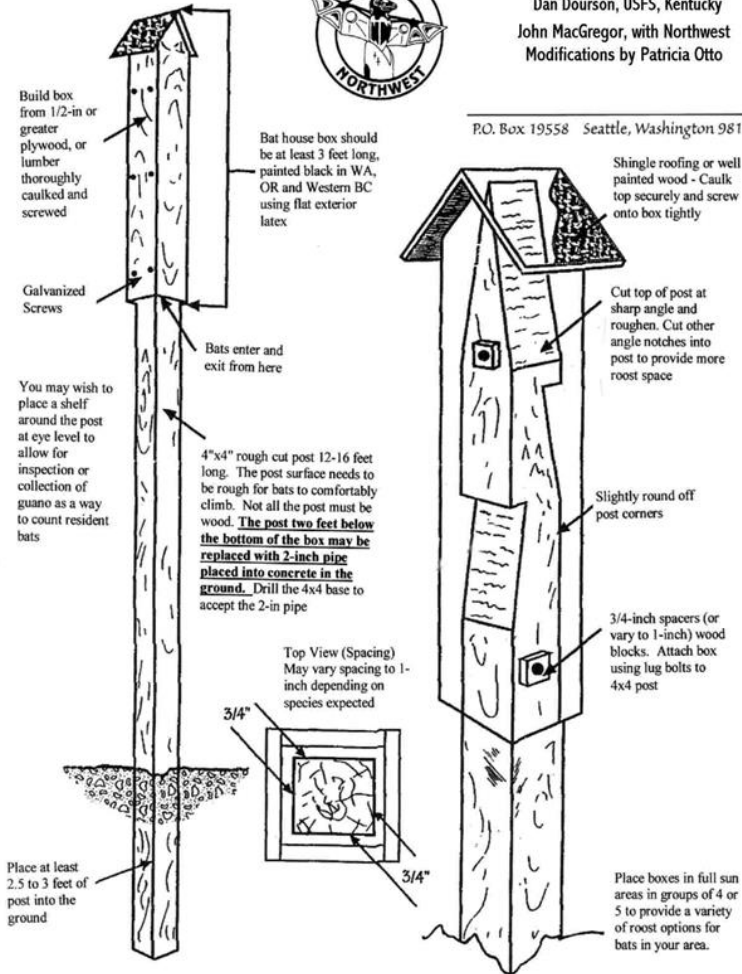
# ROCKET BOX



## Rocket Box Bat House Design

Dan Dourson, USFS, Kentucky  
John MacGregor, with Northwest  
Modifications by Patricia Otto

P.O. Box 19558 Seattle, Washington 98109



- Modified by Trish Otto in Bellingham
- Specific to the Pacific Northwest
- Creates heat (100+ degrees)
  - Perfect for maternity colonies
- Simulates exfoliating bark on a tree
- Easy to keep clean





- Good placement
  - In between forested area and open area
  - Offers two types of accommodations
  - Metal pole keeps climbing predators out
  - Trees allow bats to escape flying predators

# Location – on edge of woods



Figure 2. Dual Chambered Rocket Box (DCR).

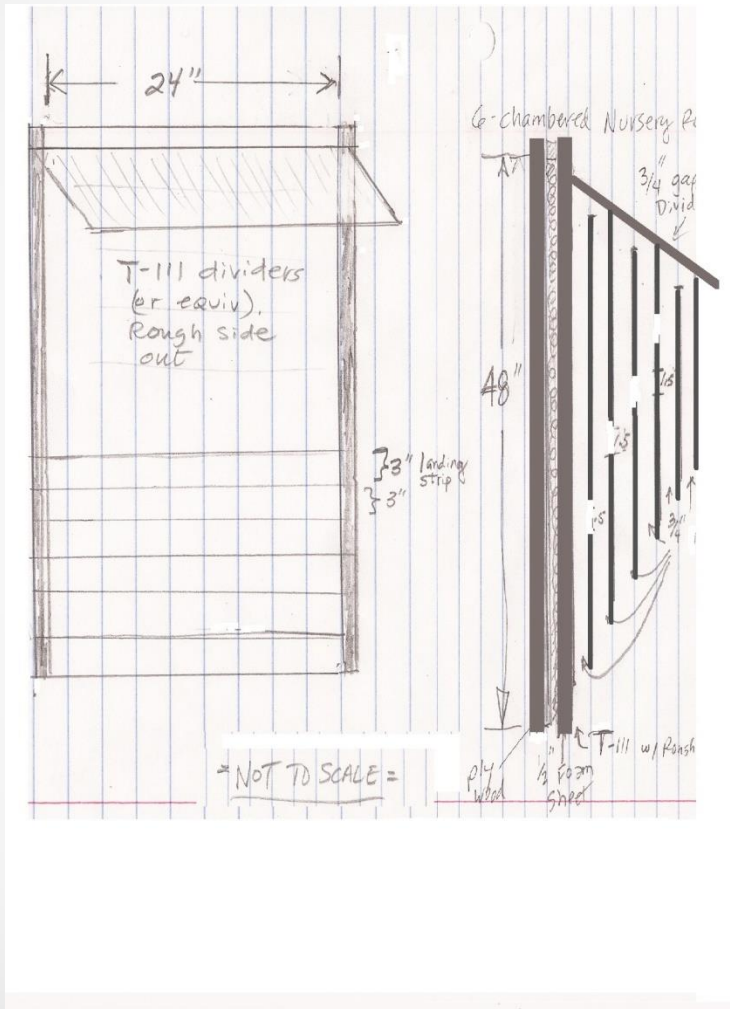


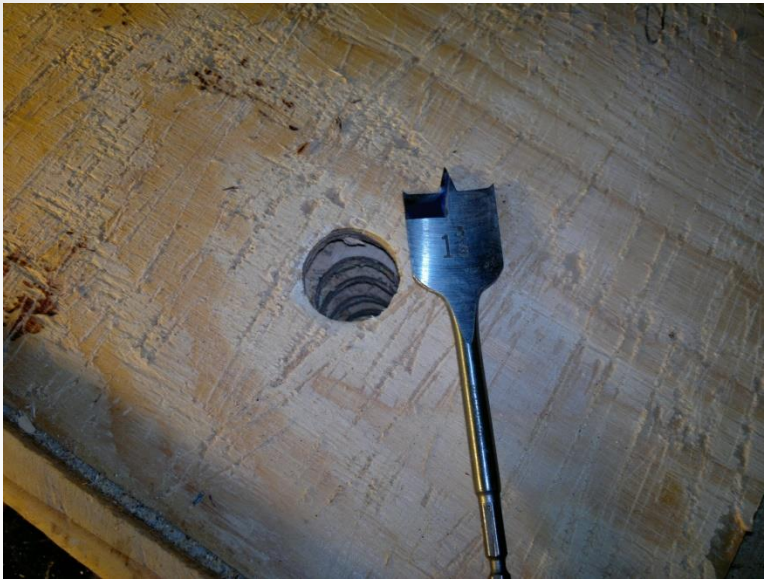
Figure 3. Mammoth Box.



Figure 4. Uncle George Box (UG).

# Cave-like Bat House





1" hole drilled at different locations to allow bats to go back and forth between sections.



Ideal installation of bat box.  
Can be used on the side of a house or barn to facilitate an exclusion.

# BAT HOUSES ONLINE



No vent, paint black, longer landing pad



Inside space too wide, paint black, longer landing pad

Darker color, doesn't need vent, single cell is good



# Fancy bat houses



# UNIVERSITY OF FLORIDA

## LARGEST OCCUPIED “BAT HOUSE” IN NORTH AMERICA



- Mexican free-tail bats
- 300, 000 bats
- Bat house and bat barn – 750, 000
- 2.5 billion of leafhoppers, moths, midges, winged ants, beetles, and other night flying insects

[www.flmnh.ufl.edu/index.php/bats/home/](http://www.flmnh.ufl.edu/index.php/bats/home/)

# REMEMBER...

- Bats in the Pacific Northwest (west of the Cascades) like it HOT!!!
  - 100+ degrees
  - That's why they roost in attics, under roof shingles, along eaves
  - Paint your bat house black
- Bats need a landing pad to get inside the bat house
- Bats need small spaces
  - $\frac{3}{4}$ " between roosting areas inside house
  - Rough up walls or use plastic netting for little toes to hang on
- 12 – 15 feet in the air
  - Bats need to swoop down under in order to fly
- Some species cannot take off from the ground



# JOINT BASE LEWIS/McCORD



Remember: bats roost most anywhere they like!!!

# Pacific Northwest Bat Gallery

- California Myotis *Myotis californicus*
- Little Brown Myotis *Myotis lucifugus*
- Keen's Myotis *Myotis keenii*
- Western Long-eared Myotis *Myotis evotis*
- Fringed Myotis *Myotis thysanodes*
- Yuma Myotis *Myotis yumanensis*
- Long-legged Myotis *Myotis volans*
- Big Brown Bat *Eptesicus fuscus*
- Silver-haired Bat *Lasionycteris noctivagans*
- Hoary Bat *Lasiurus cinereus*
- Townsend's Big-eared Bat *Corynorhinus townsendii*
  
- Bats found east of the Cascade Mountains
  - Canyon Bat *Parastrellus hesperus*
  - Spotted Bat *Euderma maculatum*
  - Pallid Bat *Antrozous pallidus*
  - Western Small-footed Myotis *Myotis ciliolabrum*

# THANKS

- Bill Kraus for photos and video
- Greg Falxa for information and photos
- Merlin Tuttle for photos
- Washington Department of Fish and Wildlife
- Everyone else I have ever talked to about bats

