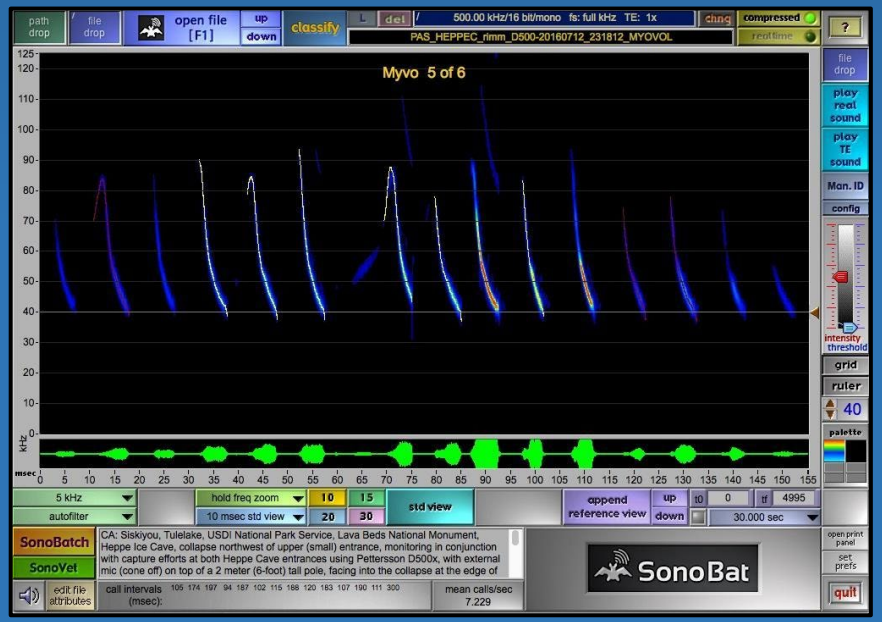
Field Methods

Timing of surveys

- When are bats most active?
  - Low light (Moon new, below horizon, cloudy, etc.)
  - Low wind
  - Mid-late summer
- Question of interest?
  - Use life-history to guide survey timing

Acoustics

- Components
  - Ultrasonic microphone
  - Detector/ recorder
- Software to visualize/ identify call sequences to species



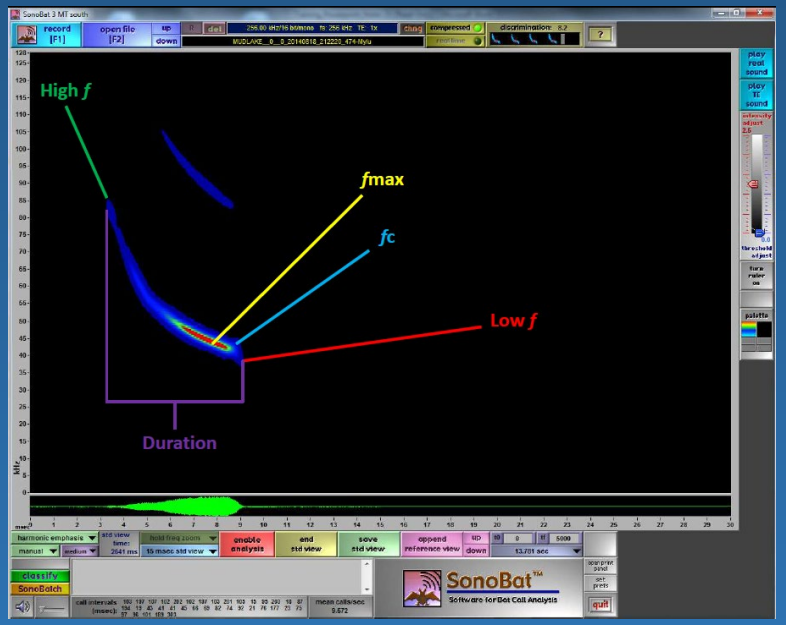
Using acoustic detectors

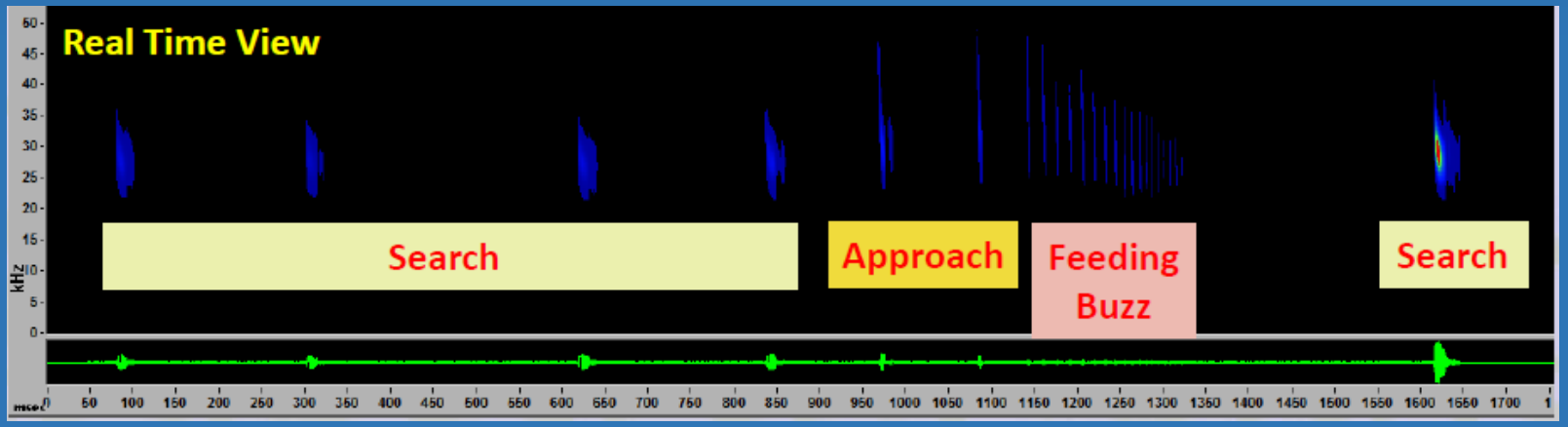
- Microphone range
- Placement of detectors
  - Open areas better
  - Water helps bring animals into range
  - Water or other smooth surfaces can cause reflection
  - Off-ground

- Common mistakes
  - Close to clutter/ roosts/ ground etc.
  - Trusting Auto-ID

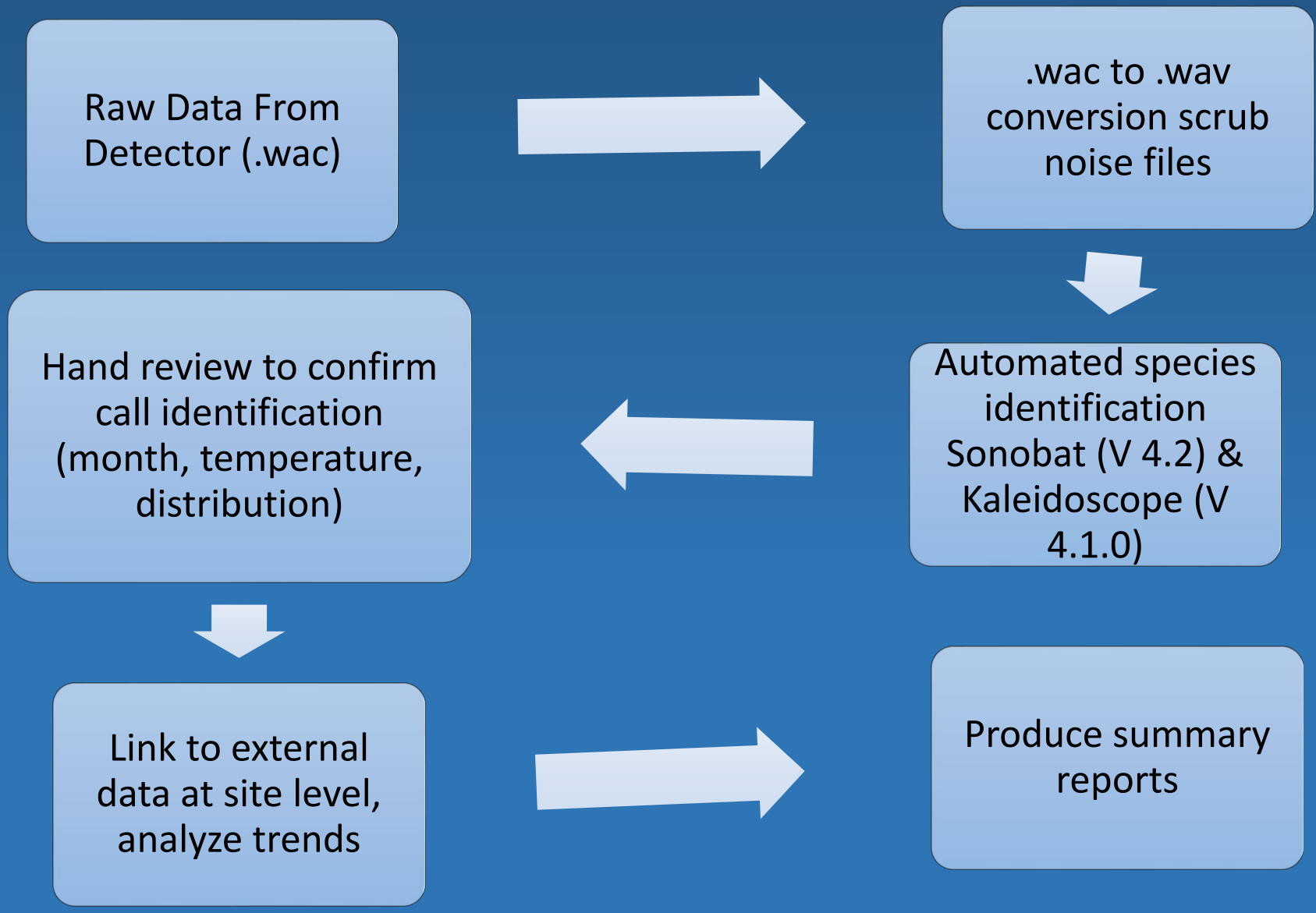
Overview of call ID

- Call attributes
- Sequences
- Most calls are not identifiable to species





Processing methods (simplified)



Species Code Key			
Fourcode	Common Name	Scientific Name	Notes
ANPA	Pallid Bat	*Antrozous pallidus*	Range limited to southeastern Montana, calls with definitive characteristics are rarely recorded.
COTO	Townsend's Big-eared Bat	*Corynorhinus townsendii*	Calls are relatively quiet and may not always trigger recordings on bat detectors.
EPFU	Big Brown Bat	*Eptesicus fuscus*	
EUMA	Spotted Bat	*Euderma maculatum*	Low frequency calls, may be filtered out as noise by some classification software on default settings.
LABO	Eastern Red Bat	*Lasiurus borealis*	Calls overlap with Little Brown Bat, over-classification by auto-ID software as this species common.
LACI	Hoary Bat	*Lasiurus cinereus*	
LANO	Silver-haired Bat	*Lasionycteris noctivagans*	
MYCA	California Myotis	*Myotis californicus*	
MYCI	Western Small-footed Myotis	*Myotis ciliolabrum*	
MYEV	Long-eared Myotis	*Myotis evotis*	
MYLU	Little Brown Myotis	*Myotis lucifugus*	
MYSE	Northern Myotis	*Myotis septentrionalis*	Range very limited, only known from eastern Montana along the Missouri River near North Dakota.
MYTH	Fringed Myotis	*Myotis thysanodes*	
MYVO	Long-legged Myotis	*Myotis volans*	Calls with definitive characteristics are rarely recorded.
MYYU	Yuma Myotis	*Myotis yumanensis*	
PAHE	Canyon Bat	*Parastrellus hesperus*	Not known to occur in Montana, only recorded at detectors on the Snake River in Idaho.
	Auto-identification trends shared for this species.		
	Auto-identification trends not shared for this species.		
	Assessment of auto-identification accuracy in progress, trends not yet shared for this species.		
	Auto-identification trends not shared for this species due to status in Montana (see notes).		

Deployment strategies

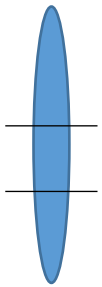
- Examples
  - Long-term detectors
    - Verify community composition
    - Data on presence/ activity across year
    - Lots of data (good and bat)
    - Less sensitive to weather, light etc.
  - Short-term (e.g. single night)
    - Occupancy
    - Cover wider area
    - Less data (good and bad)
    - Less gear
    - Can be combined with other field efforts

Mist netting

- Use nets to capture animals
- Place in areas where bats will fly at net height
  - Over water
  - In flight paths

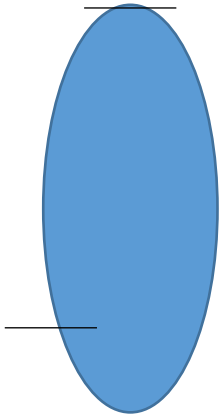
Mist net site selection

Small reservoir



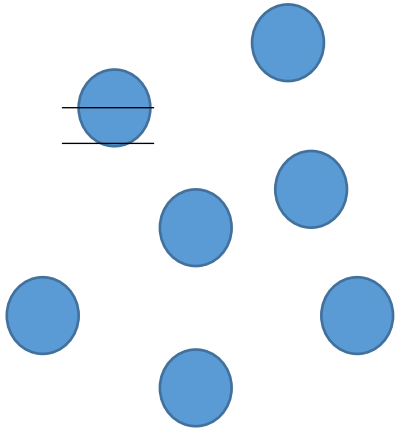
drinking site
Easy to net

Large reservoir



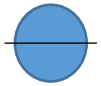
drinking and
foraging site
hard to net

Abundant
water



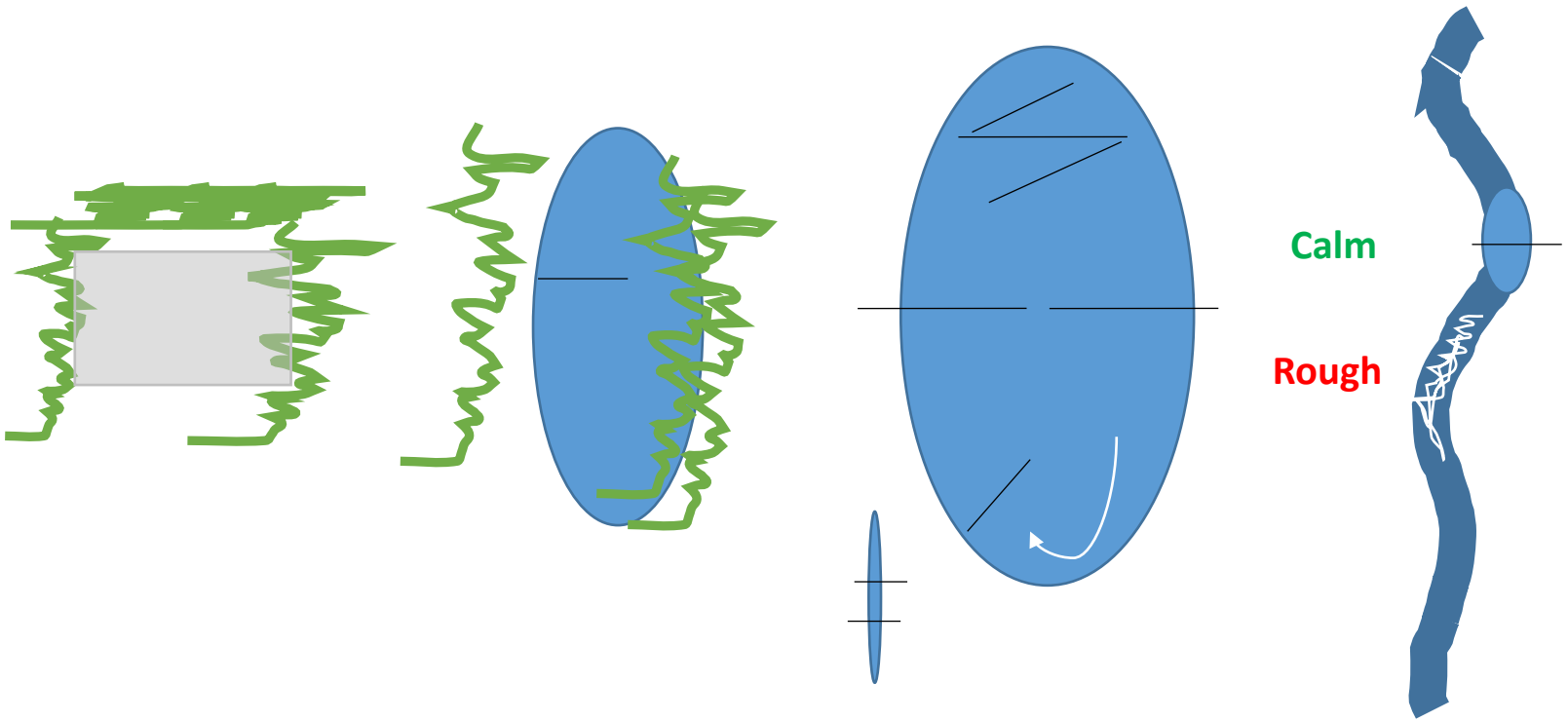
Dilution effect
difficult to net

limited water



Concentrates use
good night!

Mist net site selection



Mist netting

- May over represent some species, others difficult to capture
- Some species more detectable with nets than acoustics
- Diversity of netting sites increases diversity of species
- Netting near large waterbodies difficult

Roost surveys

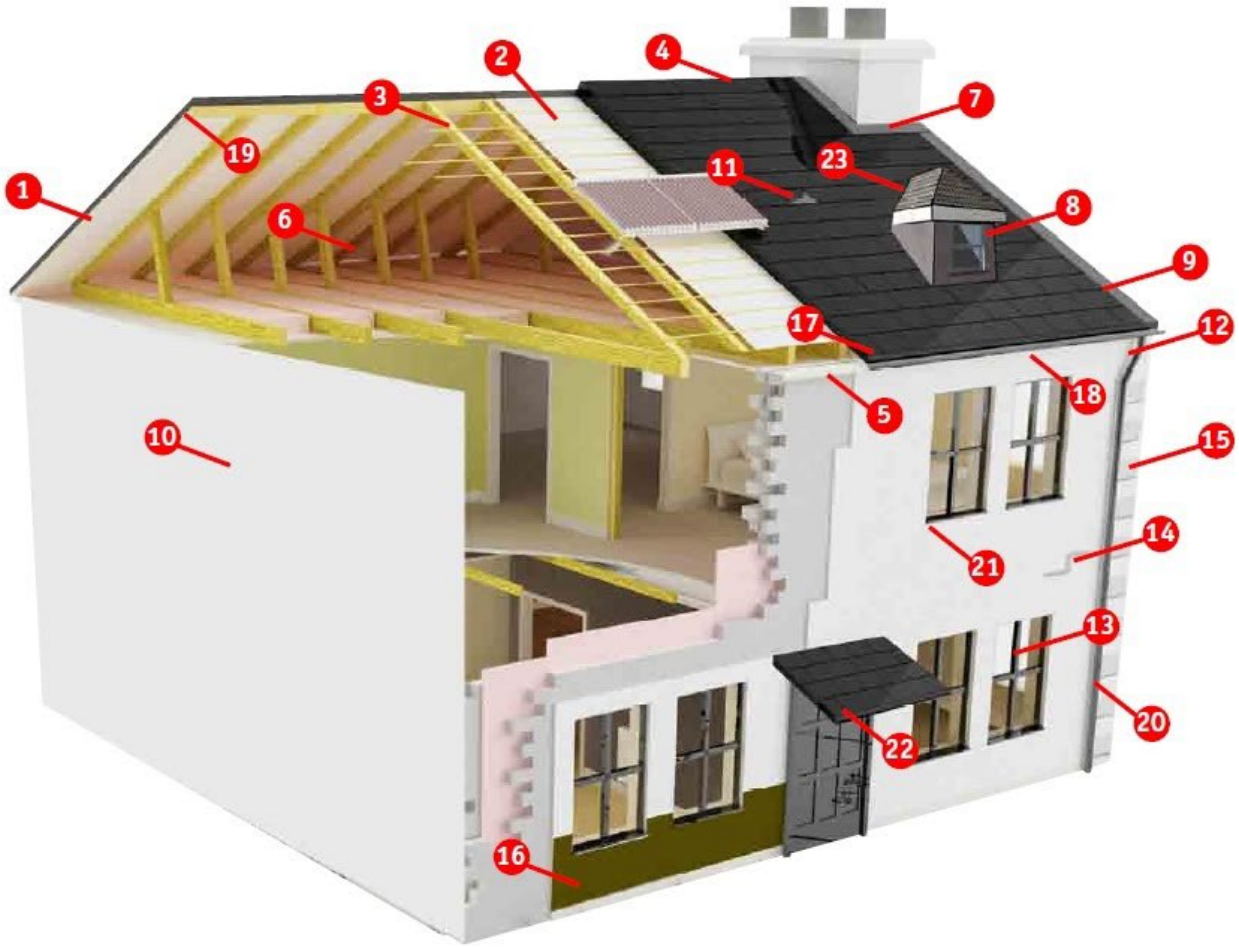
- Searches
  - Performed if potential roost is accessible
  - Counts of animals
  - Evidence of use
- Exit counts
  - Can be useful if interior of roost inaccessible
  - If enough light, direct count
  - IR or NIR cameras may be useful

Buildings

- Attics, siding, and roofs commonly used
- Look for
  - Urine staining
  - Guano
  - Bats
- Large roosts produce a characteristic smell

Possible roosting sites and access points for bats in buildings

1 Barge board
2 Roofing felt
3 Roof joists
4 Ridge tiles
5 Soffit
6 Attic
7 Lead flashing
8 Dormer window
9 Barges
10 Gable end
11 Broken tiles
12 Space between downpipe
13 Sash window
14 Lose mortar between bricks
15 Quoins
16 Wood cladding
17 End tiles
18 Facia board
19 Eaves
20 Guttering
21 Window sill
22 Porch
23 Valley



https://www.batconservationireland.org


Bridges

Bridges

- Examine underside of bridge
  - Roosting animals
  - Urine staining
  - Guano
- Use powerful lights and inspection camera to look into cracks
- Record bridge attributes

Roost Types

No presence/sign: Undetected

Bats present: Day Roost

Droppings or urine Stains: Night Roost

Amie Shovlain

Presence of young: Maternity Roost

Ellen Whittle

Night Roost Classifications

1

Small amount of droppings/urine stains in only one location

2

Small urine stains and/or scattered droppings in several locations

3

Large dropping accumulations and/or urine stains obvious and widespread

4

Dropping accumulations several inches thick in several locations. Roosting evident throughout structure.

Rock Outcrops

- Established protocols based on reptile surveys
- Work across area of interest examining:
  - Crevices
  - Under rocks
- Use bright light
- Record detections, roost attributes
- Effective but a lot of work
- Can be combined with guano collection/ genetic ID

Cave and Mine surveys

- Special training equipment necessary

Survey Effort To Determine Absence from Abandoned Mines and Caves

Sherwin et al. 2003, Wildlife Society Bulletin 31(1):62-72

Lot's of survey work needed to confirm absence!
Less expensive to assume presence!