Assessment of Bridges in Eastern Montana to Identify Active Season Bat Roosts

Rachel Hopkins (Carroll College)

D. Grant Hokit (Carroll College)

Dan Bachen, Montana Natural Heritage Program

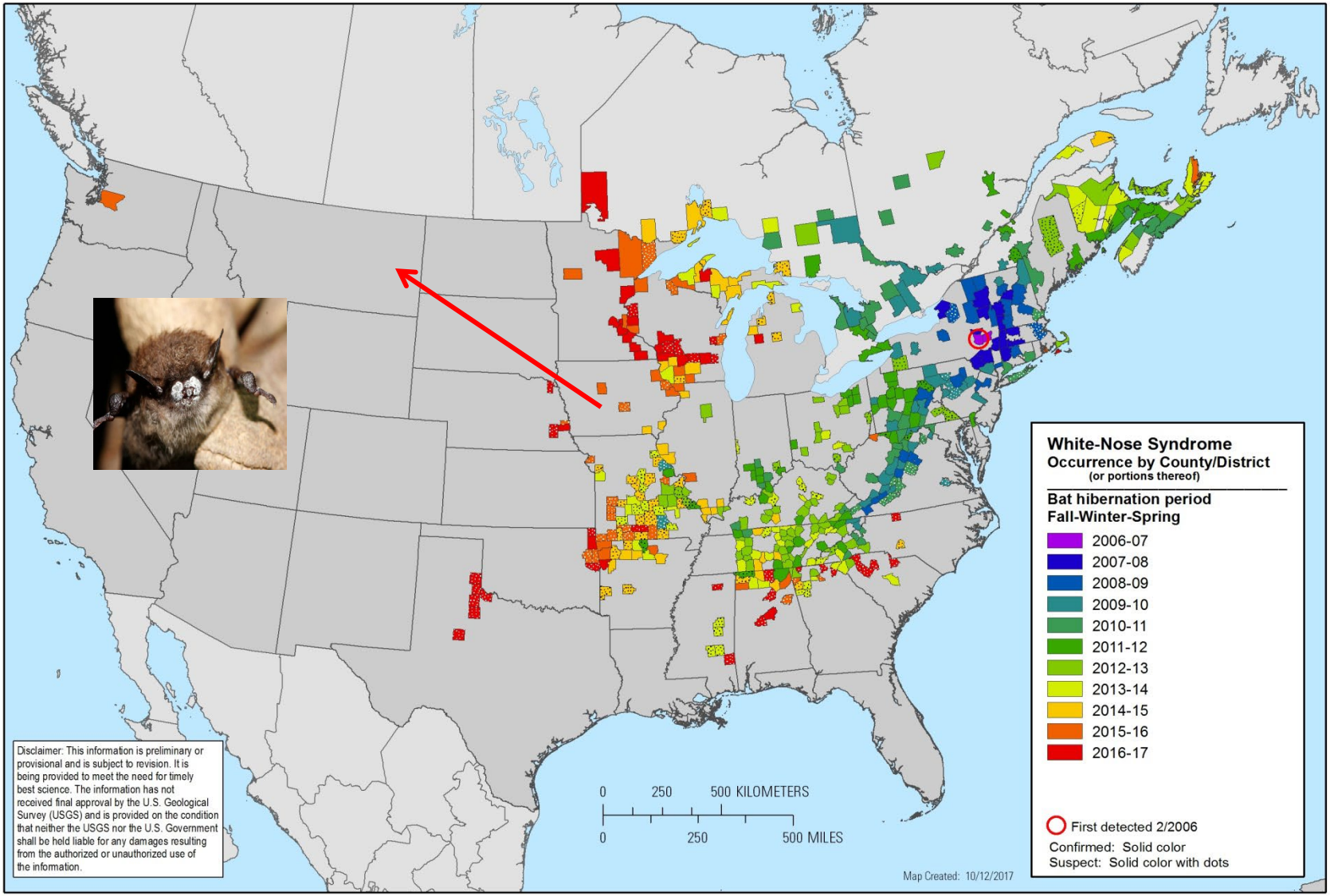
Bryce Maxell (Montana Natural Heritage Program)

Importance of Bats

- Important roles as pollinators, insect-eaters (Boyles et al. 2011; Whitaker 1995)
- Reduction of agricultural pests (Boyles et al. 2011)
- $3.7 billion to $53 billion annually for agricultural industry (Boyles et al. 2011)

Threat of White-Nose Syndrome

- Infectious disease caused by the fungus, *Pseudogymnoascus destructans*
- Characteristic white hyphae on muzzle/wings
- Usually fatal
- 98% mortality in some sites (Turner et al. 2011)
- >5 million deaths in E. US and Canada (Frank et al. 2014)



Citation: White-nose syndrome occurrence map - by year (2017). Data Last Updated: 10/12/2017. Available at: https://www.whitenosesyndrome.org/resources/map.

Bats of Montana

Pallid Bat
(*Antrozous pallidus*)

Townsend's Big-eared Bat
(*Corynorhinus townsendii*)

Big Brown Bat
(*Eptesicus fuscus*)

Spotted Bat
(*Euderma maculatum*)

Silver-haired Bat
(*Lasionycteris noctivagans*)

Eastern Red Bat
(*Lasiurus borealis*)

Hoary Bat
(*Lasiurus cinereus*)

California Myotis
(*Myotis californicus*)

Western Small-footed Myotis
(*Myotis ciliolabrum*)

Long-eared Myotis
(*Myotis evotis*)

Little Brown Myotis
(*Myotis lucifugus*)

Northern Myotis
(*Myotis septentrionalis*)

Fringed Myotis
(*Myotis thysanodes*)

Long-legged Myotis
(*Myotis volans*)

Yuma Myotis
(*Myotis yumanensis*)

Discover Montana's Wildlife

discover, preserve, protect

Living with Wildlife

Montana Natural Heritage Program

For more information on all of Montana's native species visit the Montana Field Guide
http://fieldguide.mt.gov

batcon.org BAT CONSERVATION INTERNATIONAL

Montana Nongame Wildlife Checkoff

Montana Fish, Wildlife & Parks

The University of Montana

Thanks to the contributing photographers, editors, and sponsors that made this poster possible!

Natural Roosting

- Trees/snags
- Rock outcrops
- Caves
- Rock fissures
- Talus slopes

Townsend's Big-eared Bat (*Corynorhinus townsendii*)

Eastern Red Bat (*Lasiurus borealis*)

Artificial Roosting

Mines, buildings, sheds, barns, bat boxes, **bridges**

Big Brown Bat *(Eptesicus fuscus)*

Fringed Myotis (*Myotis thysanodes*)

Little Brown Myotis (*Myotis lucifugus*)

Long-eared Myotis (*Myotis evotis*)

Hoary Bat (*Lasiurus cinereus*)

Western Small-footed Myotis (*Myotis ciliolabrum*)

Main Objectives

- Identify locations of active season roosts for further monitoring
- Establish baseline knowledge about bat roosting preferences

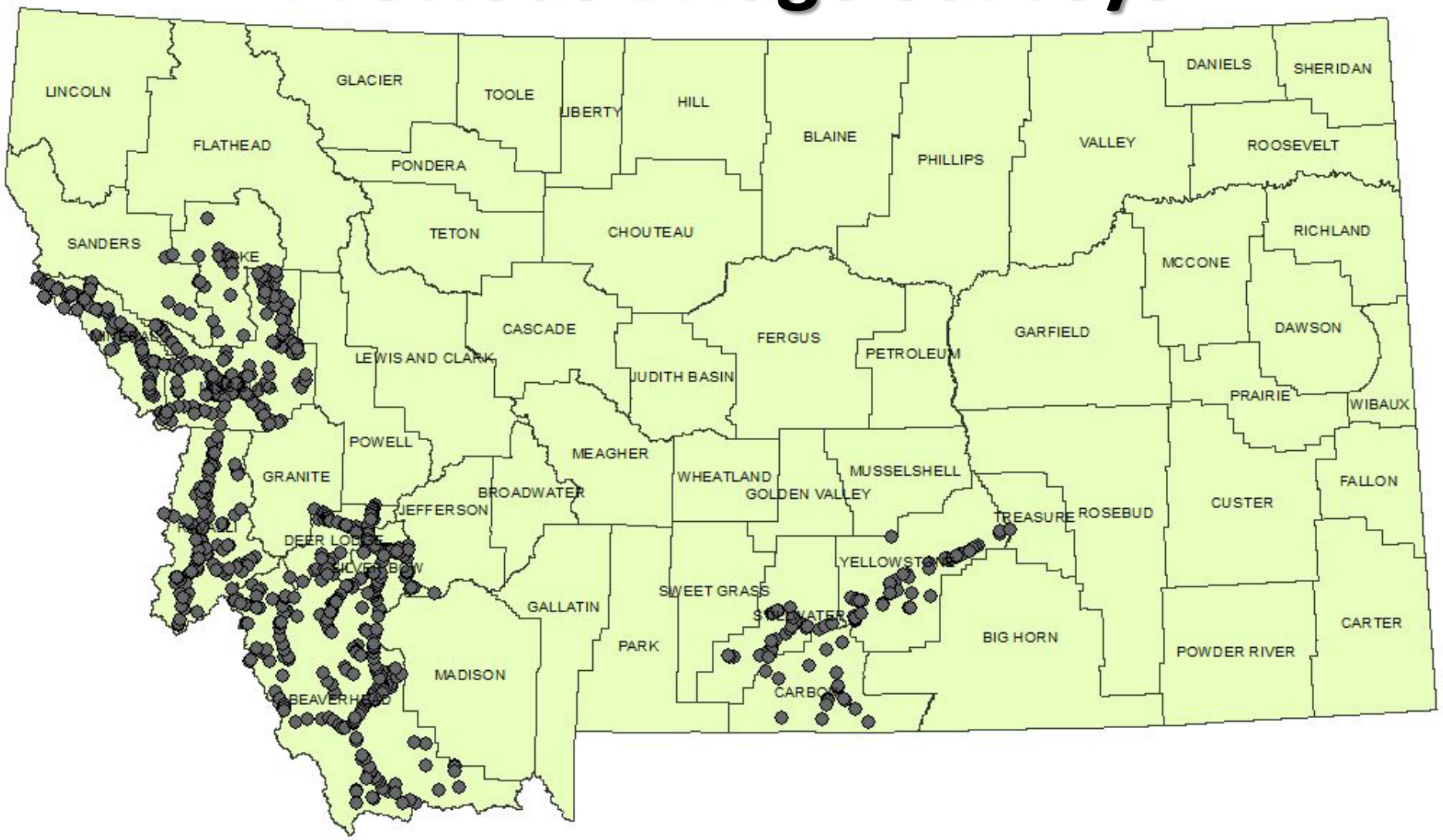
Specific Questions for Analysis

- How does bat use of bridges differ by decking material?
- How does the presence or absence of ideal crevices affect bat use of bridges?
- How does bat use of bridges in Eastern Montana compare to bat use throughout the state?
- What species are using bridges as roosts?

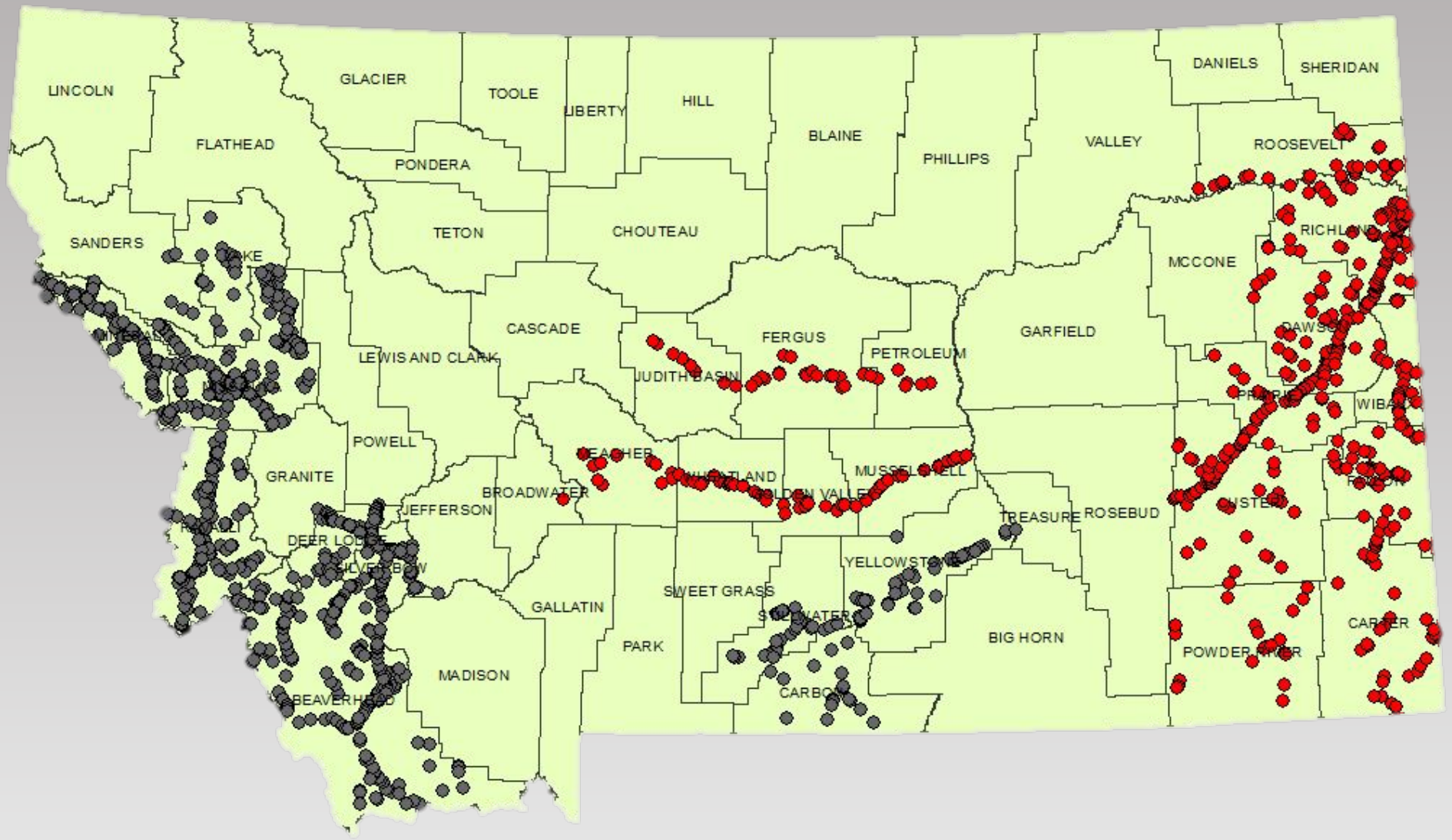
Field Methods

- Inspect underside of bridge
- Classify by roost type
  - Day
  - Night
  - Maternity
  - None
- Record additional information (structure, habitat, etc.)

Previous Bridge Surveys



Bridges I surveyed



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

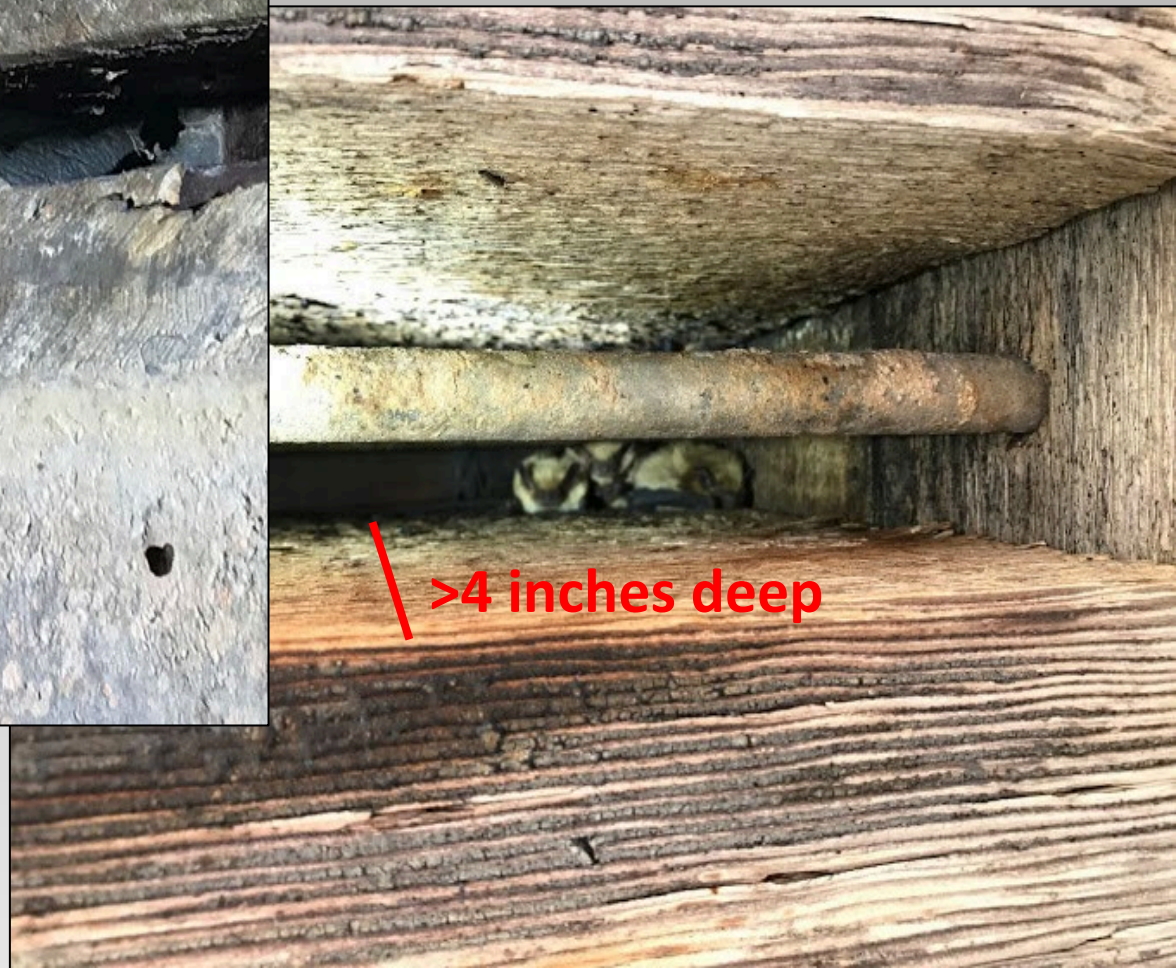
3

Large dropping accumulations and/or urine stains obvious and widespread

4

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

Ideal Crevices



Bridges

Wooden

Steel

Concrete

Data Analysis Methods

- Contingency analysis
- Graphical comparison
- Genetic Species Identification (National Genomics Center for Wildlife and Fish Conservation)

Results

Percentage of each bridge type used

Concrete

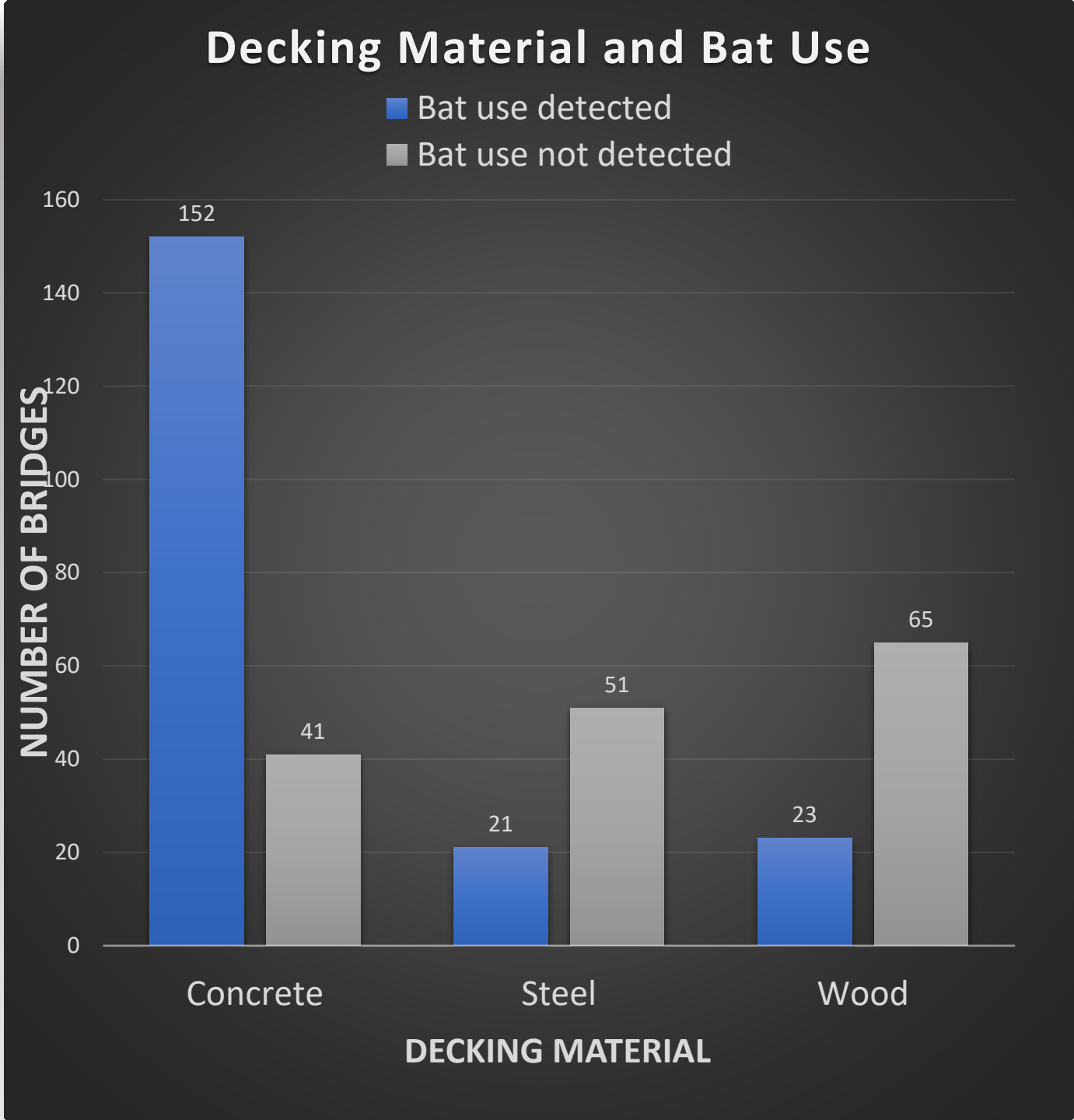
152/193=**78.8%**

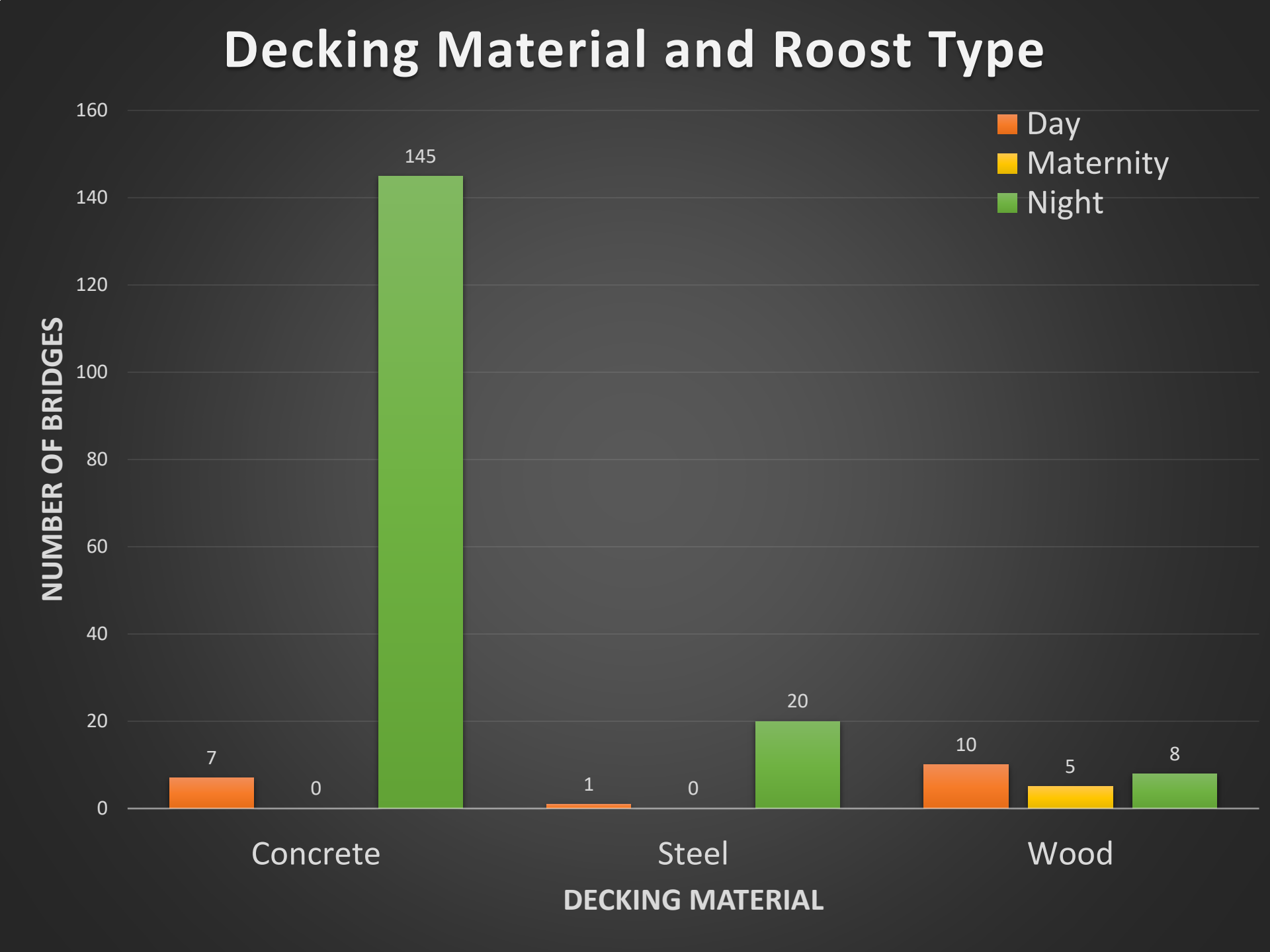
Steel

21/72= **29.2%**

Wood

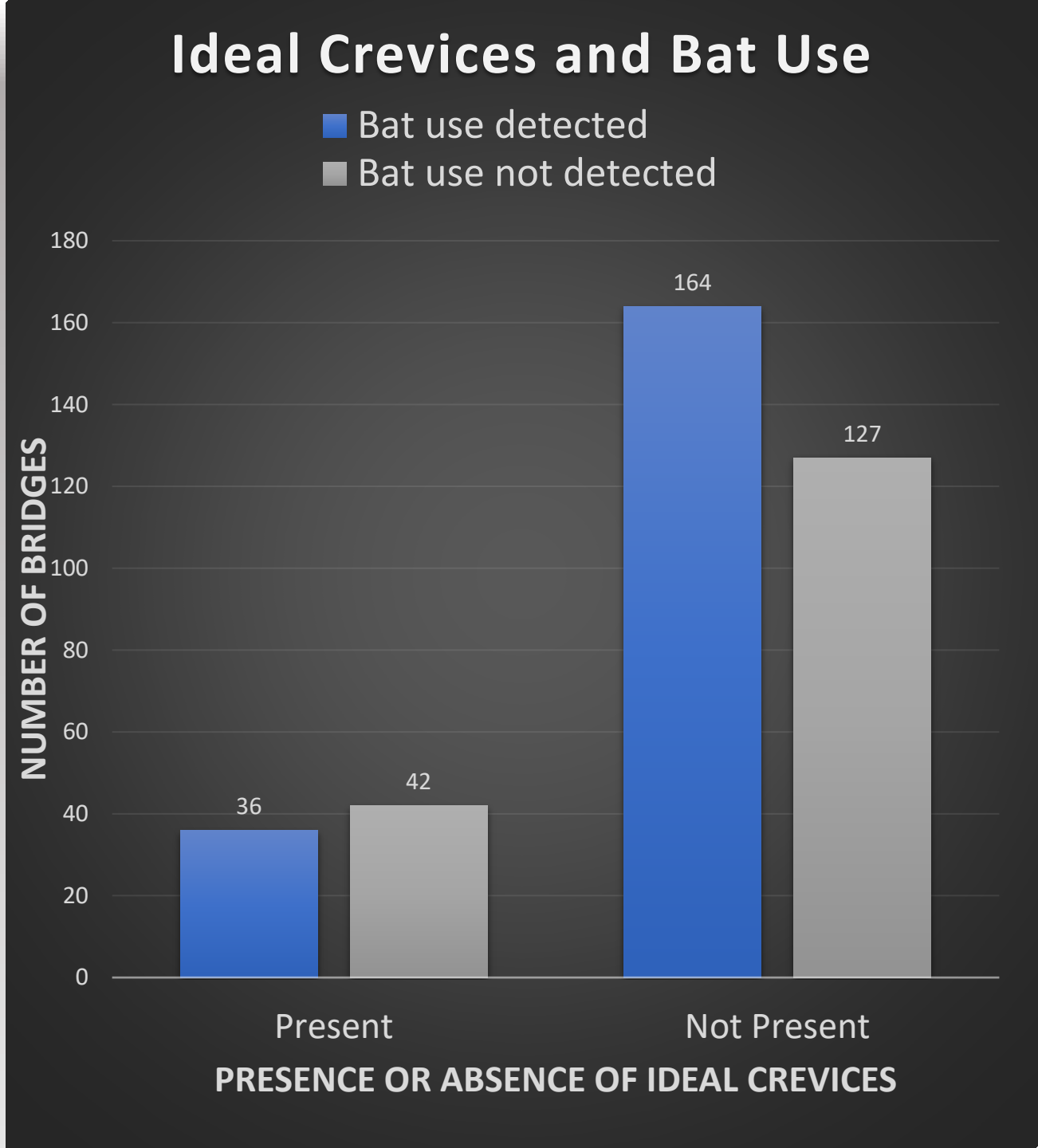
23/88= **26.1%**




Decking Material and Roost Type
160
140
120
100
80
60
40
20
0
NUMBER OF BRIDGES
Day
Maternity
Night
145
7
0
1
0
20
10
5
8
Concrete
Steel
Wood
DECKING MATERIAL

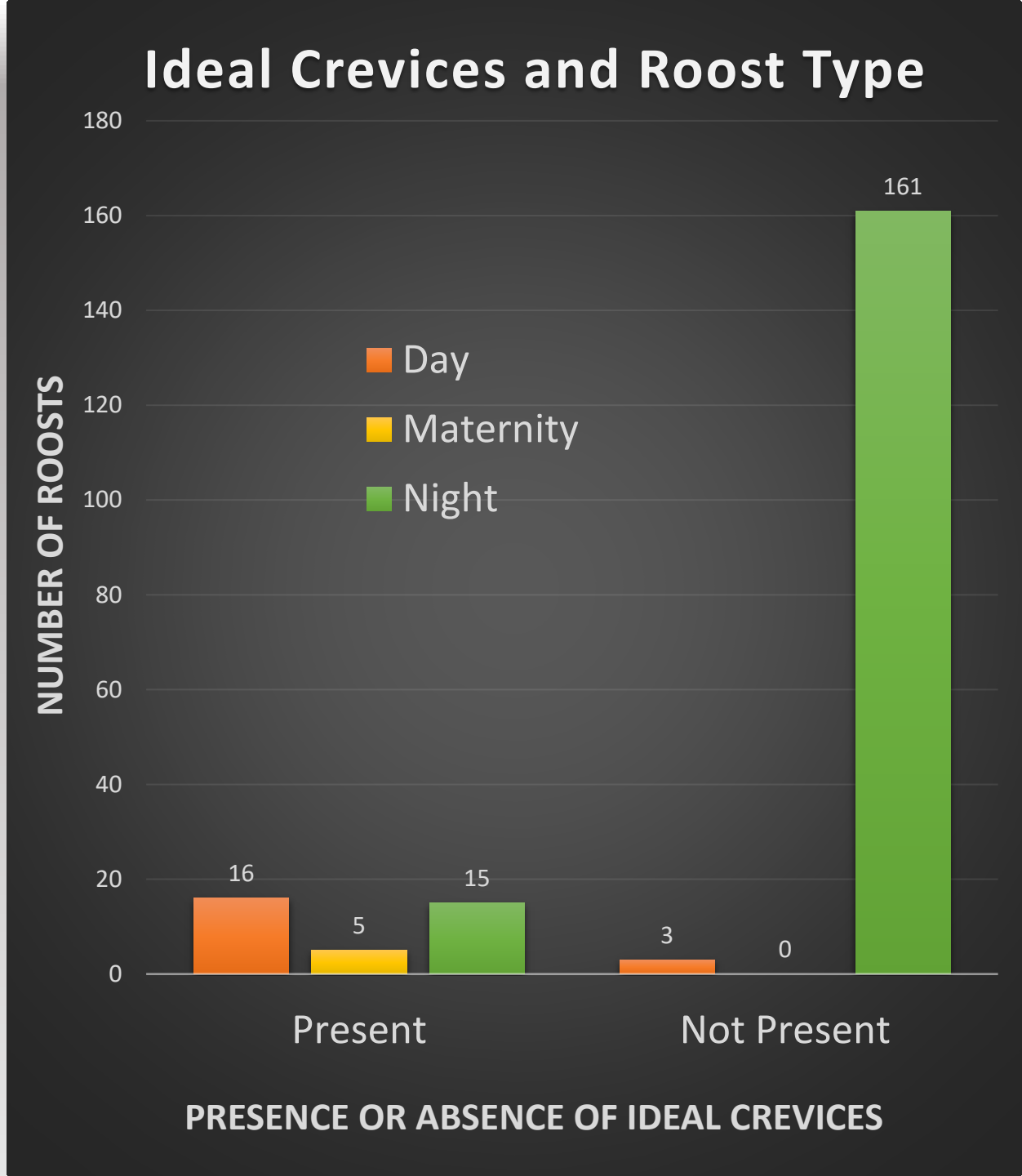
Results

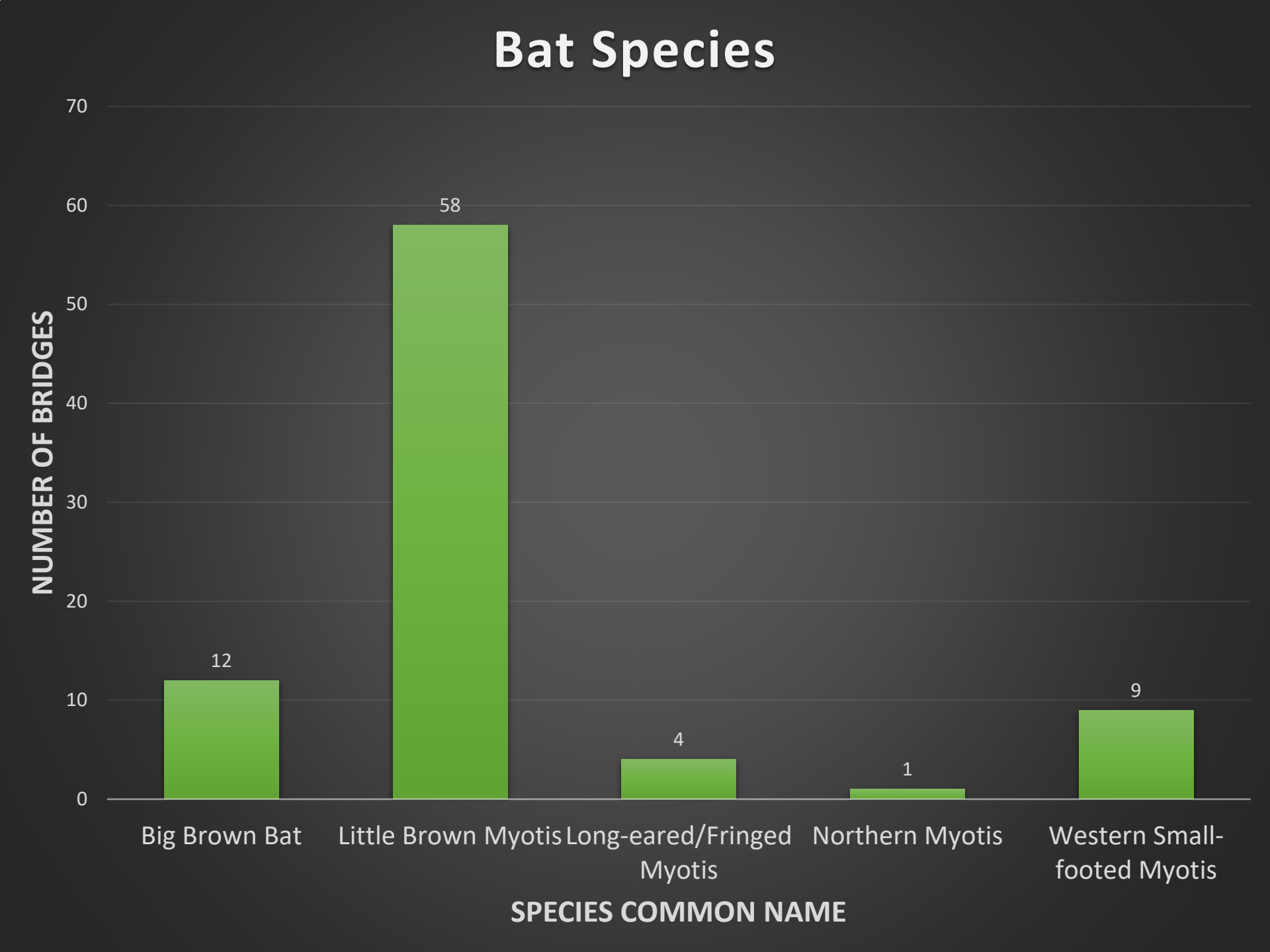
- Most bridges do not have ideal crevices
- Not necessary for bat use in general
- Contingency analysis
  - P<0.108



Results

- Maternity roosts only in bridges with ideal crevices
- Most day roosts in bridges with ideal crevices
- Many night roosts in bridges without ideal crevices
- Contingency analysis
  - P<0.00001

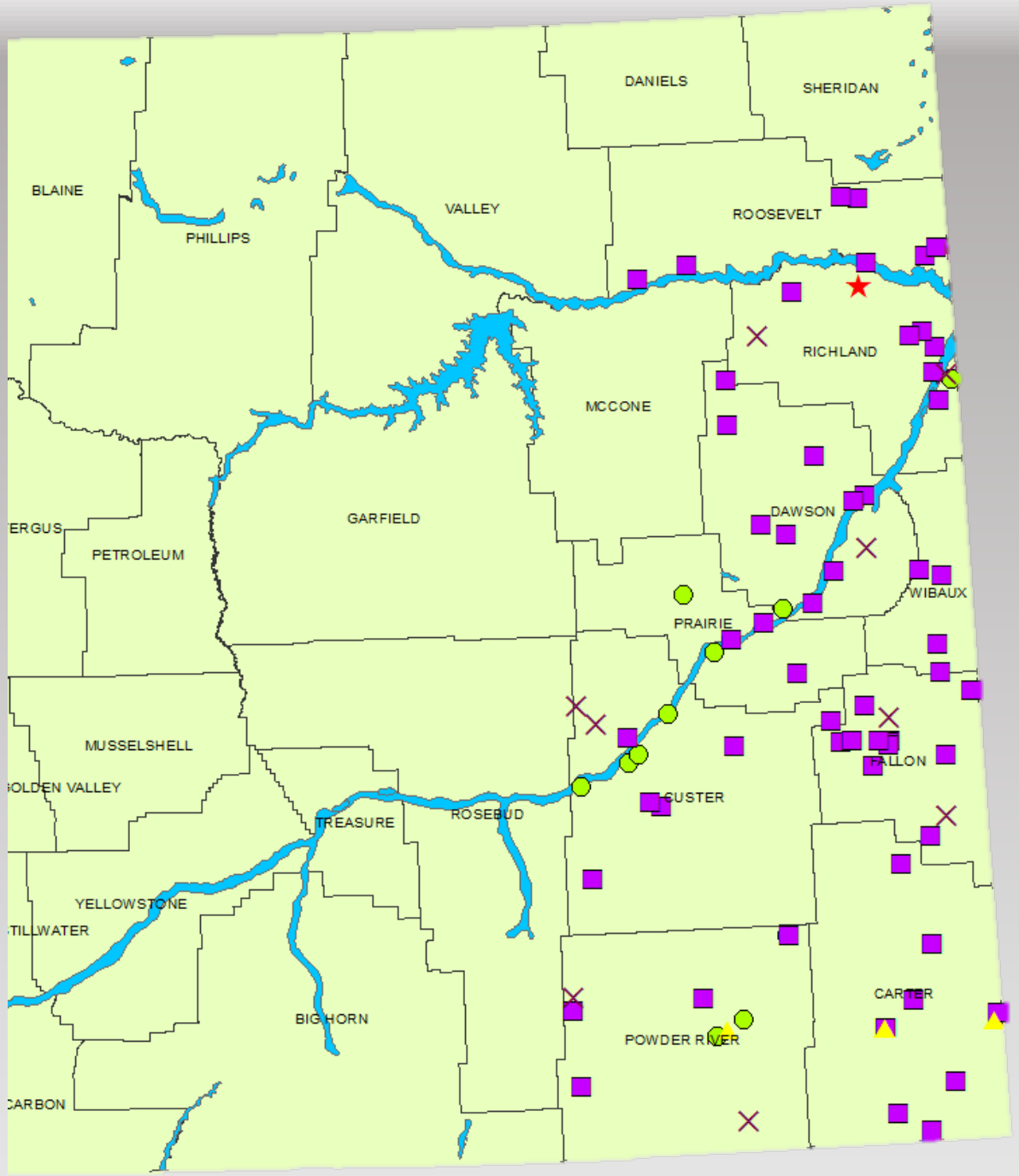



Bat Species
70
60
50
40
30
20
10
0
NUMBER OF BRIDGES
12
58
4
1
9
Big Brown Bat
Little Brown Myotis
Long-eared/Fringed Myotis
Northern Myotis
Western Small-footed Myotis
SPECIES COMMON NAME

Bat Species Locations

Legend

- Big Brown Bat
- Little Brown Myotis
- Long-eared/Fringed Myotis
- Northern Myotis
- Western Small-footed Myotis



Conclusions

- Data generally support earlier findings (Hendricks et al. 2005; Whittle 2015)
- Widespread use of bridges as roosts (56%)
- Concrete most numerous type available for roosts
- Night roosts most numerous type of roost--Selection for night roosts different than selection for day/maternity roosts

Conclusions

- Wood vs. concrete for maternity roosts
- More bridges with bat friendly designs
- Northern Myotis—first time documented using bridge as roost
- Greatly increased known roosts—no prior bridge surveys in this area
- Bridge surveys efficient method
- Next area: Highline

Questions?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Program
http://mtnhp.org
National Genomics Center
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