
CERCA:

**Bat acoustic monitoring in
the Cowichan Valley**

2022

Tool used: Acoustic monitor - Echo Meter

Uncertainty

Important notes:

- Once a bat echolocation signal is detected
 - the software makes an interpretation as to the identity of the bat species.
 - the identification is a '*likely*' identification and not an absolute identification.
- As an illustration of the caution needed is that a neighbour's car starting around 6:00 a.m. was interpreted by the software as being a Spotted bat,

(*Euderma maculatum*, whose calls range from 18 to 7 kHz,
well within the audible range for humans.)

Where tested

Locations: mix Inland & Coastal,



- 10 locations
 - 3 inland
 - Dry forest
 - Riparian
 - Lake front
 - Bog
 - Meadow
 - Urban
 - Sub urban
 - Rural
 - Gary Oak
 - Doug Fir
 - Maple
 - Cedar
 - Hemlock
 - Alder
 - Ocean Spray
 - Sitka

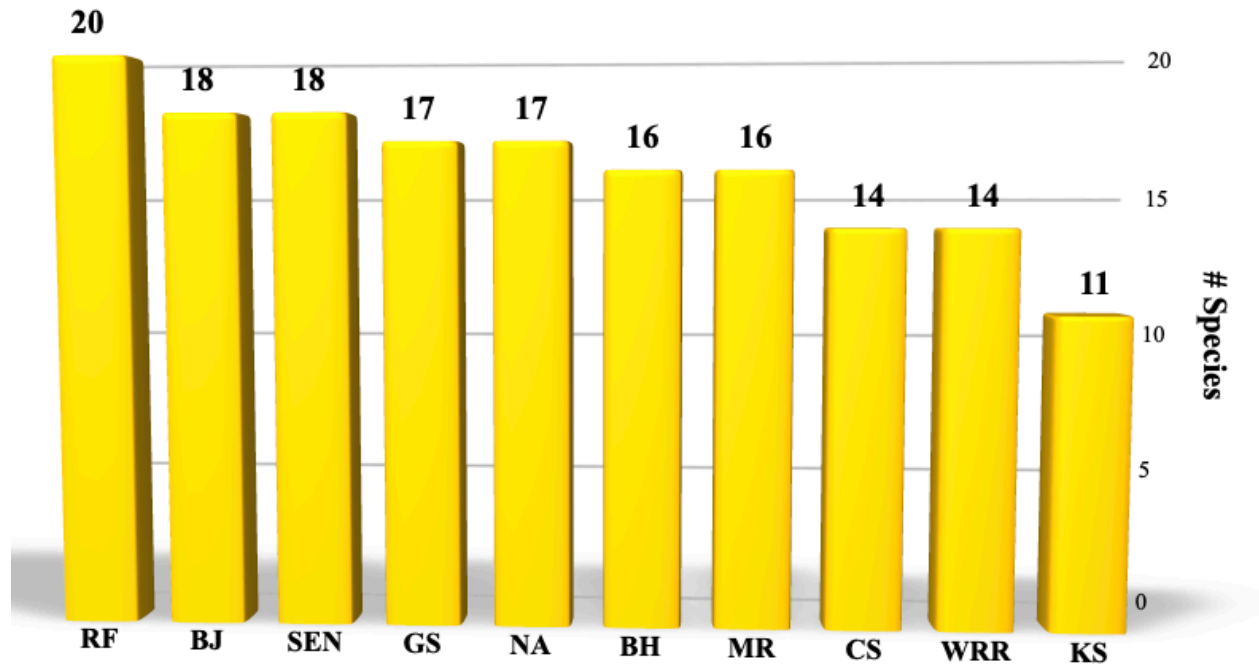
Locations: Wide range of activity

Hits per day per location



Locations:

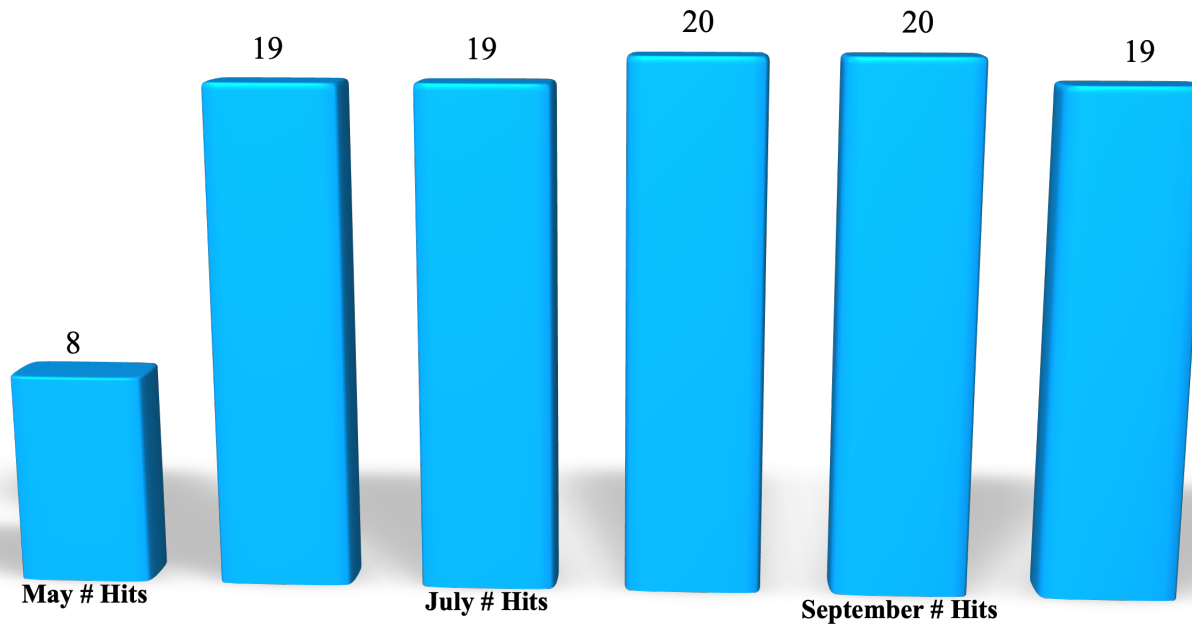
Species



- Fairly even distribution of # of species per location
- WRR with far and away largest activity - 2nd lowest # species
- RF the closest location to WRR has highest # of species - 20 vs 14

When tested: Fairly consistent

#. Species per Month

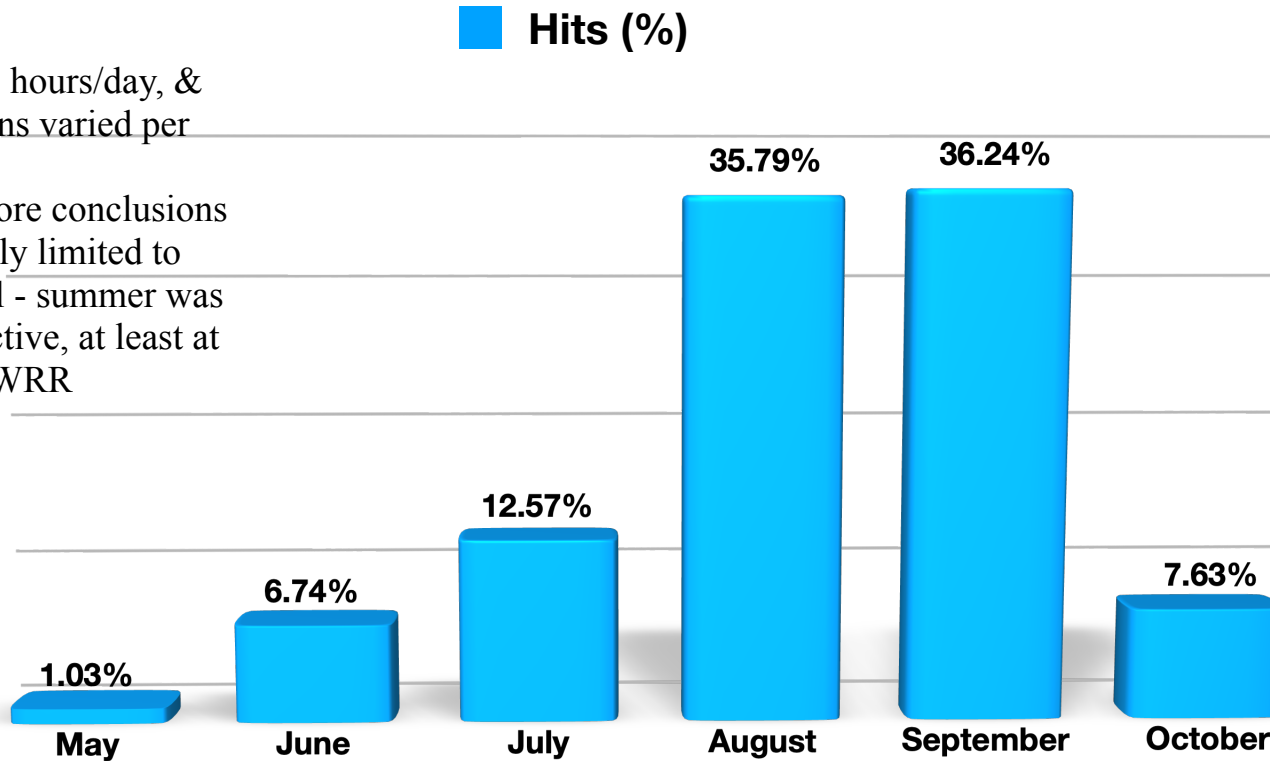


- Very consistent # species each month
- May - very limited data collection

When tested

Note:

- # days, hours/day, & locations varied per month;
- Therefore conclusions probably limited to general - summer was very active, at least at RF & WRR



Acronyms & Species names

of our 10 most active species

Acronym	Species Name
MYOYUM	<i>Myotis yumanensis</i> (Yuma myotis)
MYOLUC	<i>Myotis lucifugus</i> (little brown)
LASNOC	<i>Lasionycteris noctivagans</i> (silver-haired)
MYOCAL	<i>Myotis californicus</i> (California myotis)
LASCIN	<i>Lasiurus cinerius</i> (hoary)
MYOCIL	<i>Myotis ciliolabrum</i> (Western small-footed)
TADBRA	<i>Tadarida brasiliensis</i> (Mexican-free-tailed bat)
MYOEVO	<i>Myotis evotis</i> (long-eared myotis)
EPTFUS	<i>Eptesicus fuscus</i> (big brown)
MYOVOL	<i>Myotis volans</i> (long-legged myotis)

Note:

- 6 of our top 10 are *Myotis*
- Including 3 of our top 4

HAT: Habitat Acquisition Trust; our ID's of Myocil (Western Small Footed) may actually be Myovol (Long Legged Myotis)

What we found

Species	Hits
MYOYUM	11,004
MYOLUC	10,561
LASNOC	4,694
MYOCAL	4,366
LASCIN	1,391
MYOCIL	1,390
TADBRA	1,168
MYOEVO	944
EPTFUS	858
MYOVOL	565
PARHES	265
LASBOR	246
MYOSEP	221
MACCAL	133
PERSUB	113
MYOTHY	110
ANTPAL	88
CORTOW	73
EUDMAC	24
MOLMOL	12
LASBLO	8
LASINT	6
Total: # Hits, %	38,240

- Our monitors identified 22 species
- The top ten species in the Table to the left include eight of the nine species recognized by HAT to be on Vancouver Island.
- According to HAT the following nine species have been recorded on Vancouver Island: Eptfus, Lasnoc, Lascin, Myocal, Myoevo, Myoluc, Myovol, Myoyum and Cortow (see: <https://hat.bc.ca/bats>)
- Cortow, recognized by HAT to be present on Vancouver Island, is only eighteenth on our list.
- The top ten species on our list also includes Myocil, not known to be on Vancouver Island.
 - The call of Myocil is very similar to that of Myovol and possibly the calls identified as that of Myocil are actually made by the Long-legged myotis (*Myotis volans*)

Our most common



Yuma Myotis; *Myoyum*

Myotis Lucifugus; *Myoluc*



HAT identified: confirmed on Vancouver Island

Our top 10 Species: By # hits		Hits	Percentage of Total Hits	HAT confirmed
Yuma myotis:	myoyum	11,004	28.8%	Y
Little Brown myotis:	myoluc	10,561	27.6%	Y
Silver-haired bat:	lasnoc	4,594	12.3%	Y
California myotis:	myocal	4,366	11.4%	Y
Hoary bat:	lascin	1,391	3.6%	Y
Western Small-footed myotis: myocil		1,390	3.6%	N
Mexican Free-tailed bat:	tadbra	1,168	3.1%	N
Western Long-eared myotis: myoevo		944	2.5%	Y
Big Brown bat:	eptfus	858	2.2%	Y
Long-legged myotis:	myovol	565	1.5%	Y

HAT confirmed on Vancouver Island:

- Eptfus, Lasnoc, Lascin, Myocal, Myoevo, Myoluc, Myovol, Myoyum and Cortow
- 8 of the 9 species are in our top 10
- **Cortow** is confirmed & is our #18

Not confirmed by HAT & in our top 10

- **Western Small-footed Myotis** - Myocil
- **Mexican Free-tailed** - Tadbra is considered by Lausen *et al.* to be an accidental species in BC;
- it has been recorded on Salt Spring Island, and may be a resident

What we found

Species	Hits
MYOYUM	11,004
MYOLUC	10,561
LASNOC	4,694
MYOCAL	4,366
LASCIN	1,391
MYOCIL	1,390
TADBRA	1,168
MYOEVO	944
EPTFUS	858
MYOVOL	565
PARHES	265
LASBOR	246
MYOSEP	221
MACCAL	133
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Total: # Hits, %	38,240

Some collectors placed the following species in the Auto ID function:

- i) *Lasiurus intermedius*, Northern Yellow bat (Lasint), found in the eastern part of the US
- ii) *Molossus molossus*, Pallas' Mastiff bat, (Molmol), found in the Caribbean and further south

Although these species were identified a very few times (14), they are most likely mis-identifications.

What we found

Species	Hits	Hits (% of T)
MYOYUM	11,004	28.78%
MYOLUC	10,561	27.62%
LASNOC	4,694	12.28%
MYOCAL	4,366	11.42%
LASCIN	1,391	3.64%
MYOCIL	1,390	3.63%
TADBRA	1,168	3.05%
MYOEVO	944	2.47%
EPTFUS	858	2.24%
MYOVOL	565	1.48%
PARHES	265	0.69%
LASBOR	246	0.64%
MYOSEP	221	0.58%
MACCAL	133	0.35%
PERSUB	113	0.30%
MYOTHY	110	0.29%
ANTPAL	88	0.23%
CORTOW	73	0.19%
EUDMAC	24	0.06%
MOLMOL	12	0.03%
LASBLO	8	0.02%
LASINT	6	0.02%
Total: # Hits, %	38,240	100.00%

Species by # hits and % of total hits

What we found

Species	Hits	Hits (% of T)	% cumulative
MYOYUM	11,004	28.78%	28.78%
MYOLUC	10,561	27.62%	56.39%
LASNOC	4,694	12.28%	68.67%
MYOCAL	4,366	11.42%	80.09%
LASCIN	1,391	3.64%	83.72%
MYOCIL	1,390	3.63%	87.36%
TADBRA	1,168	3.05%	90.41%
MYOEVO	944	2.47%	92.88%
EPTFUS	858	2.24%	95.13%
MYOVOL	565	1.48%	96.60%
PARHES	265	0.69%	97.30%
LASBOR	246	0.64%	97.94%
MYOSEP	221	0.58%	98.52%
MACCAL	133	0.35%	98.87%
PERSUB	113	0.30%	99.16%
MYOTHY	110	0.29%	99.45%
ANTPAL	88	0.23%	99.68%
CORTOW	73	0.19%	99.87%
EUDMAC	24	0.06%	99.93%
MOLMOL	12	0.03%	99.96%
LASBLO	8	0.02%	99.98%
LASINT	6	0.02%	100.00%
Total: # Hits, %	38,240	100.00%	

Species by:

- # hits
- % of total hits
- Cumulative % of total hits

Note:

- Activity overwhelmingly by a relatively small number of species
 - Top 2 > 56%
 - Top 4 > 80%
 - Top 7 > 90%
 - Bottom 12 < 4% of total
- Top 2 > 25% each
- Next 2 > 11% each
- Next 3 > 3% each
- Next 2 > 2% each
- Next 1 > 1%
- Next 12 < 1% each

Where tested

Interesting distribution: top 10 species

Species	Hits all locations	Hits no RF or WRR	RF & WRR % of total for all locations
MYOYUM	11,004	2,815	74.4%
MYOLUC	10,561	3,562	66.3%
LASNOC	4,694	1,876	60.0%
MYOVOL	565	320	43.4%
EPTFUS	858	570	33.6%
LASCIN	1,391	976	29.8%
MYOCIL	1,390	978	29.6%
MYOCAL	4,366	3,104	28.9%
MYOEVO	944	900	4.7%
TADBRA	1,168	1,152	1.4%
Totals	36,941	16,253	56.0%
Averages	3,694.1	1,625.3	37.2%

- RF & WRR accounted for 56% of all activity for top 10 species
 - 20% of sites
 - 56% of all bat activity
 - 75% for Myoyum alone
 - Very low activity of 2 species
- Without the 2 locations the species distribution evens out considerably among the other locations

Where tested

Locations: mix Inland & Coastal,



- **10 locations**

- 3 inland
- Dry forest
- Riparian
- Lake front
- Bog
- Meadow
- Urban
- Sub urban
- Rural
- Gary Oak
- Doug Fir
- Maple
- Cedar
- Hemlock
- Alder
- Ocean Spray
- Sitka

2022

» In Sum:

- » Lots of bat activity
 - » inland riparian and forest sites dominate
 - » 4 out of 22 species account for > 80% activity
 - » Great variation hits/day/location
 - » 20% of locations 56% of activity
 - » Fairly even #s of species/location
 - » Even #s species/month
 - » Great variation activity/month - hugely skewed by RF and WRR locations
 - » Support for HAT
 - » 9 resident species &
 - » Almost certainly a few more
-

2023

» What's next?

- » Collecting another years data
 - » Common formatting
 - » Reliable acoustic monitoring
 - » 4 days at a time
 - » 7 locations
 - » 1/2 hour before sunset to 1/2 hour after sunrise
 - »

» Purpose

- » Improve information about resident species
- » Types of preferred habitats
- » Times of activity
 - » Time of year - months/weeks
 - » Time of day
 - » How many hours/day
 - » If possible time of peak activity

2023

So far:

- Lots of hits
 - So many will analyze only 1 night per week
 - Don't have Sonobat yet
 - Are not quite certain what it can do,
 - Beyond IDing bats
 - Lot of time spent figuring out data flow and organization and security

Other bats

Not recorded:

- apparently active during the day when our recording devices were off
- Reputedly, lots of them about.
- Likely in different types of habitat
- Perhaps we need different settings on our microphones.



Location & Habitat

Data Collectors & locations

Locations	Latitude.Longitude	Habitat. (urban, dry forest, wet forest, wetland, river, lake)
BH	Latitude 48 740423 Longitude -123 614494	dry forest south facing slope, Gary Oak, Douglas Fir, Maple
BJ	48.634060°N-°123.553090 W	dry, suburban, with forest south, north & west
CS	Latitude. 48 40'51"N; Longitude. 123 32'5" W	rural, dry forest, conifers to east, north, west, fir, cedar, arbutus, maple.
GS	Latitude 48 77 Longitude -123 62	dry forest south facing slope, Gary Oak, Douglas Fir, Maple
KS	Latitude 48 81 Longitude -123 97	dry forest south facing slope, Gary Oak, Douglas Fir, Maple
MR	Latitude 48 77 Longitude -123 62	dry forest south facing slope, Gary Oak, Douglas Fir, Maple
NA	Latitude 48 48 0 N Longitude -123 38 35 W	rural, lake across the street, seasonal brook/riparian, Garry Oak, Douglas Fir, Sitka
RF	Latitude 48 77 Longitude -123 82	flat, partially bog, partially dry with openings in the woods Fir, Maple, Alder, Cedar, Hemlock
SDL	Latitude 48.708 Longitude -123.654	Gary Oak, Douglas Fir, Maple
SEN	Latitude 48deg 47min 37s Longitude -123deg 38min 20s	urban, dry canary-grass meadow on steep northwest facing slope bordered by Garry oaks; detector 8m above grade
WRR	Latitude 48 76 Longitude -123 88	River riparian, south facing Douglas fir, Maple, Ocean Spray

Collectors

BH	Bill Heath
BJ	Bernie Juurlink
CS	Cliff Stainsby
GS	Goetz Schuerholz
KS	Katharine Staiger
MR	Margret Reiss
NA	Neil Anderson
RF	Rob Flach
SDL	Sarah Davies Long
SEN	Steve Nazar
WRR	Parker Jefferson

Notes:

- RF, WRR, & KS are located inland from the rest, with KS furthest west
- BJ & CS are to the south of the Valley toward the ocean
- MR, NA, & SEN are near Maple Bay
- GS & BH are near Cowichan Bay Estuary

Where tested

Locations



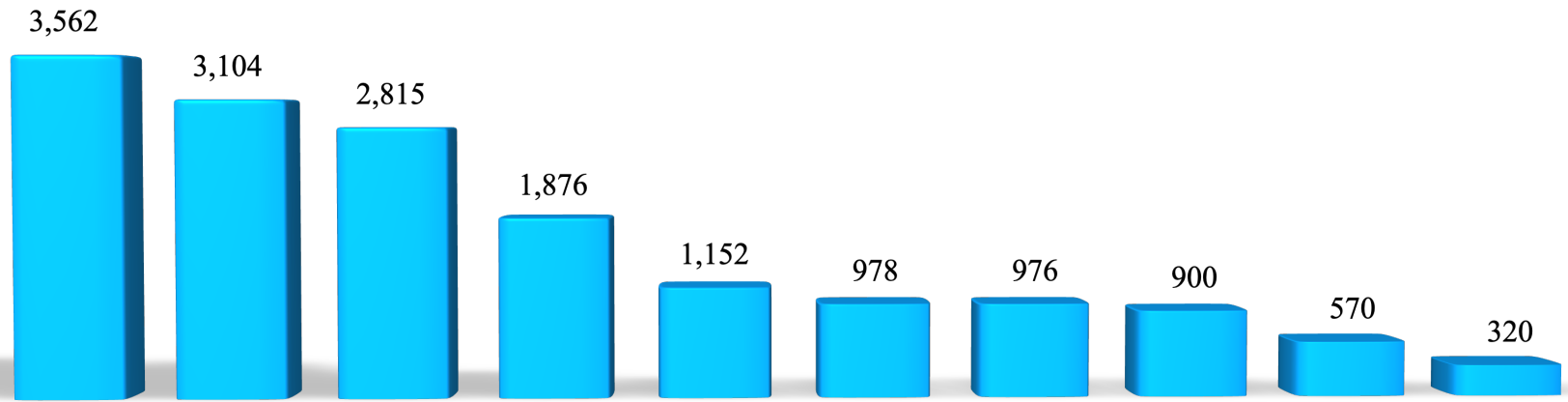
Recording days/ location

Location	Recording Days
BJ	42
SEN	34
MR	28
GS	27
NA	27
RF	27
WRR	27
BH	24
CS	17
KS	4
SDI	17
Total	274

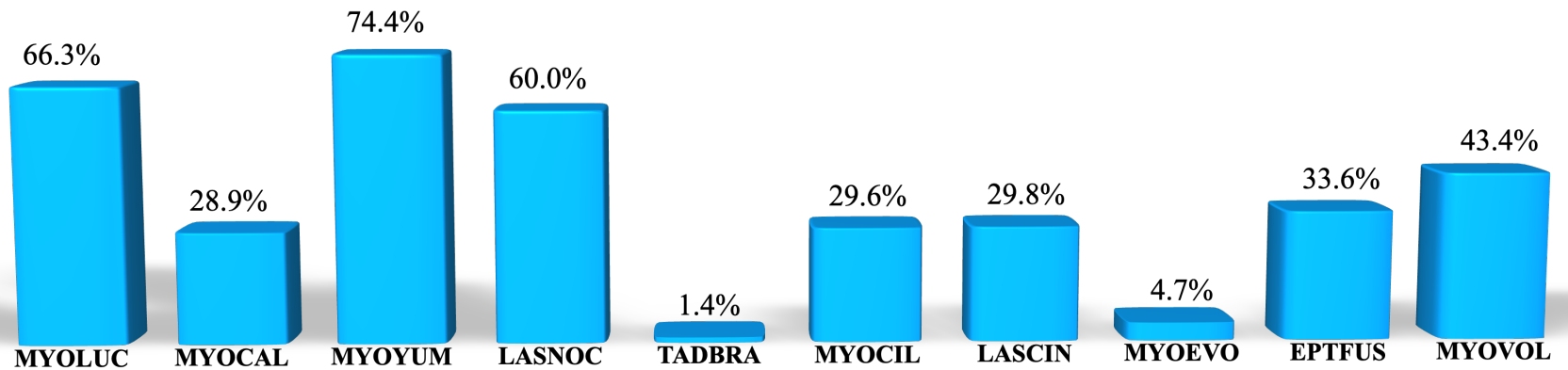
Species: Acroymms

ANTPAL	<i>Antrozous pallidus (pallid)</i>
CORTOW	<i>Corionrhinus twonsendii (Townsend's big-eared)</i>
EPTFUS	<i>Eptesicus fuscus (big brown)</i>
EUDMAC	<i>Eudema maculatum (spotted)</i>
LASBLO	<i>Lasiurus blossevillii (Western red bat)</i>
LASBOR	<i>Lasiurus borealis (Eastern red bat)</i>
LASCIN	<i>Lasiurus cinerius (hoary)</i>
LASNOC	<i>Lasionycteris noctivagans (silver-haired)</i>
MACCAL	<i>Macrotus californicus (California leaf-nosed)</i>
MYOCAL	<i>Myotis californicus (California myotis)</i>
MYOCIL	<i>Myotis ciliolabrum (Western small-footed)</i>
MYOEVO	<i>Myotis evotis (long-eared myotis)</i>
MYOLUC	<i>Myotis lucifugus (little brown)</i>
MYOSEP	<i>Myotis septentrionalis (Northern long-eared)</i>
MYOTHY	<i>Myotis thysanodes (fringed myotis)</i>
MYOVOL	<i>Myotis volans (long-legged myotis)</i>
MYOYUM	<i>Myotis yumanensis (Yuma myotis)</i>
PARHES	<i>Parastrellus hesperus (Canyon bat)</i>
PERSUB	<i>Perimyotis subflavus (tricolored bat)</i>
TADBRA	<i>Tadarida brasiliensis (Mexican-free-tailed bat)</i>

Hits by Top 10 Species: no RF or WRR location data

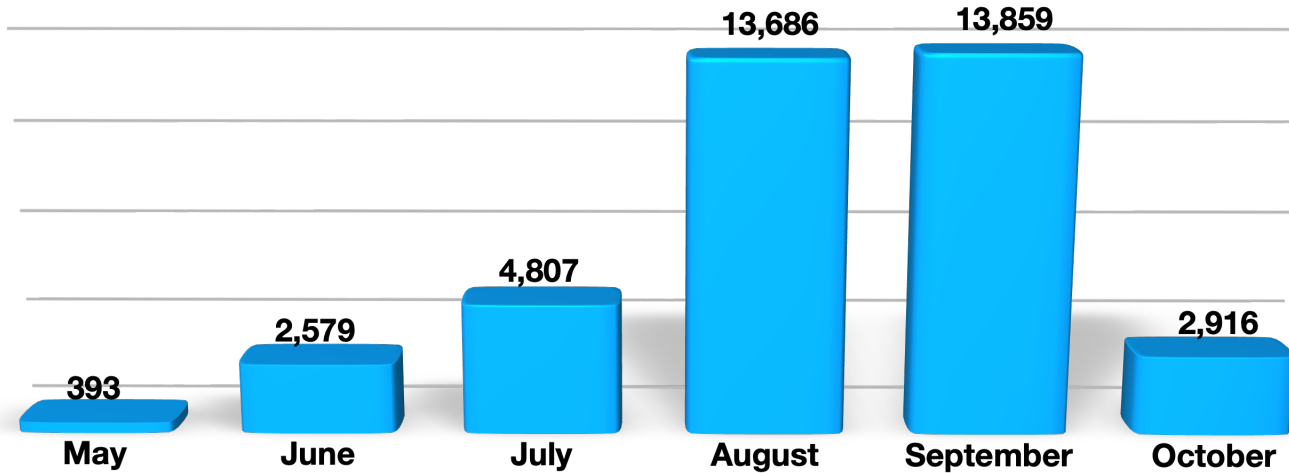


Top 10 species: % of total hits at RF and WRR



When tested

Hits/month



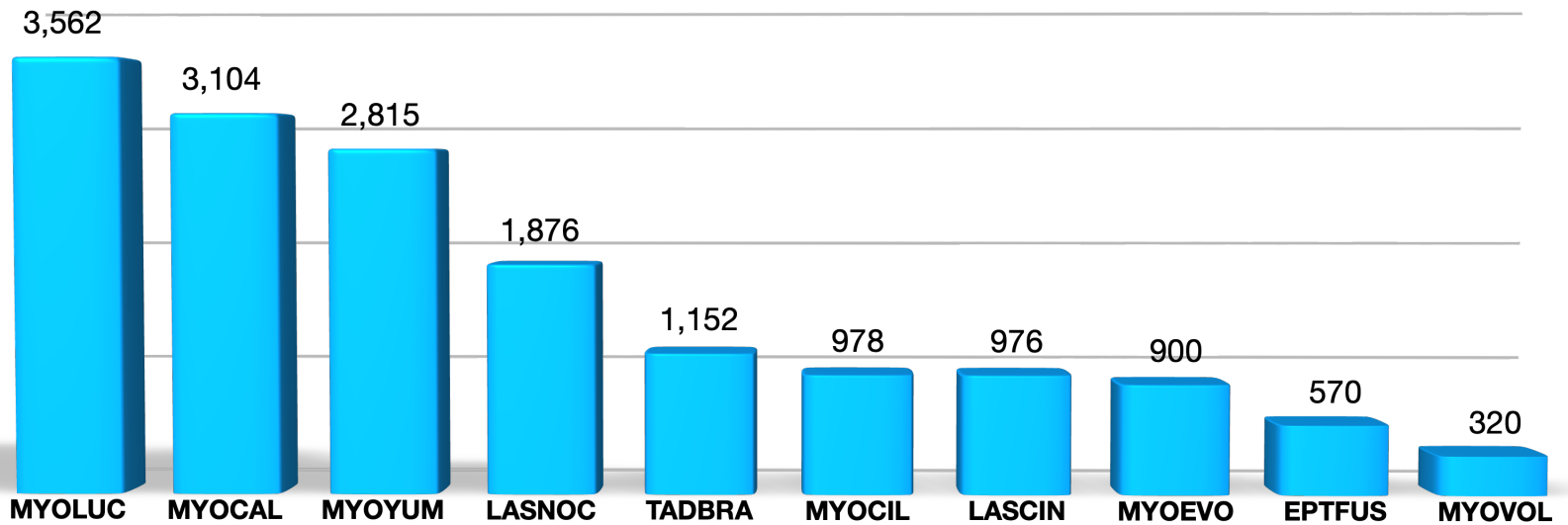
Note: # days, hours/day, & locations varied per month

Species & Acronyms

Species:Acronyms

ANTPAL	<i>Antrozous pallidus (pallid)</i>
CORTOW	<i>Corionrhinus twonsendii (Townsend's big-eared)</i>
EPTFUS	<i>Eptesicus fuscus (big brown)</i>
EUDMAC	<i>Eudema maculatum (spotted)</i>
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**Hits by Top 10 Species:
no RF or WRR location data**



■ RF & WRR % all locations

