

## Bat Population Monitoring Results

Below are some summary graphs representing changes in summer bat populations on the Monongahela NF.

Based on the MNF's long-term summer mist-net monitoring, several WNS-affected bat species showed highly significant declines (post-WNS, or post-2009), including the northern long-eared bat, little brown bat, and tri-colored bat; our captures of Indiana bats historically have not been large enough to look at a statistical decline in summer populations, but hibernacula counts do show highly significant declines in that species as well. The most severely affected species (based on mist-net data) was the little brown bat.

### Changes in summer populations of several bat species across the Monongahela, 2006-2015

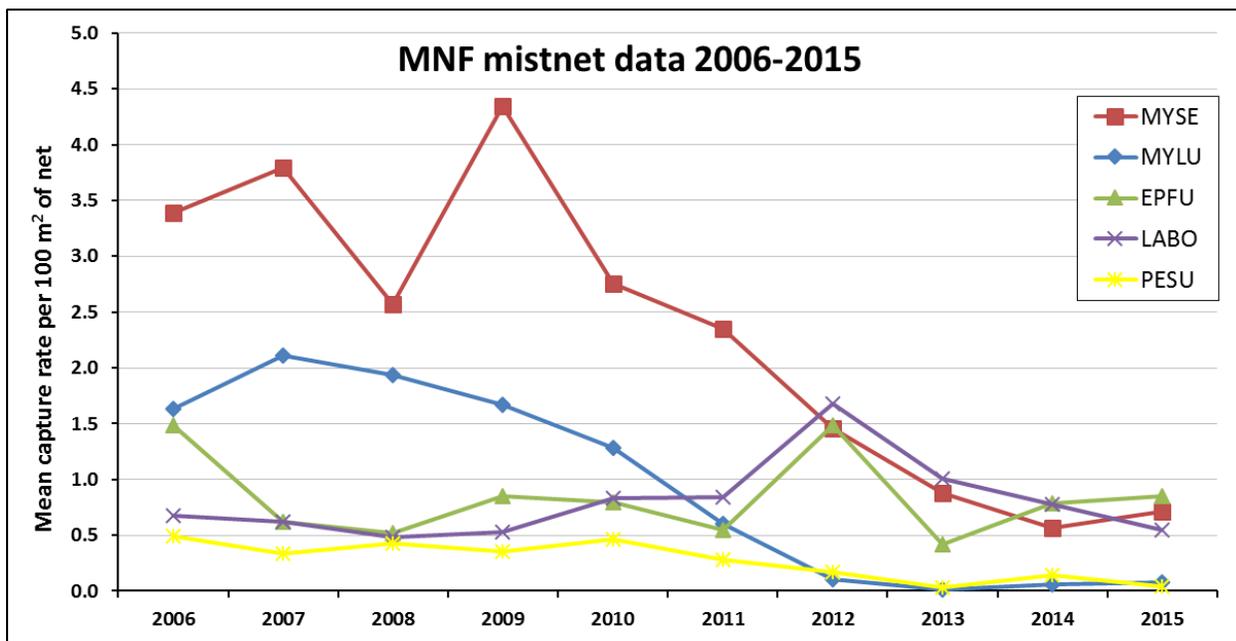
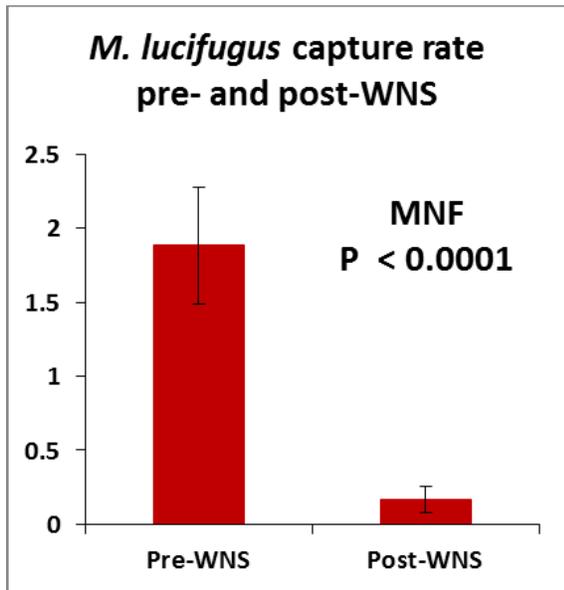
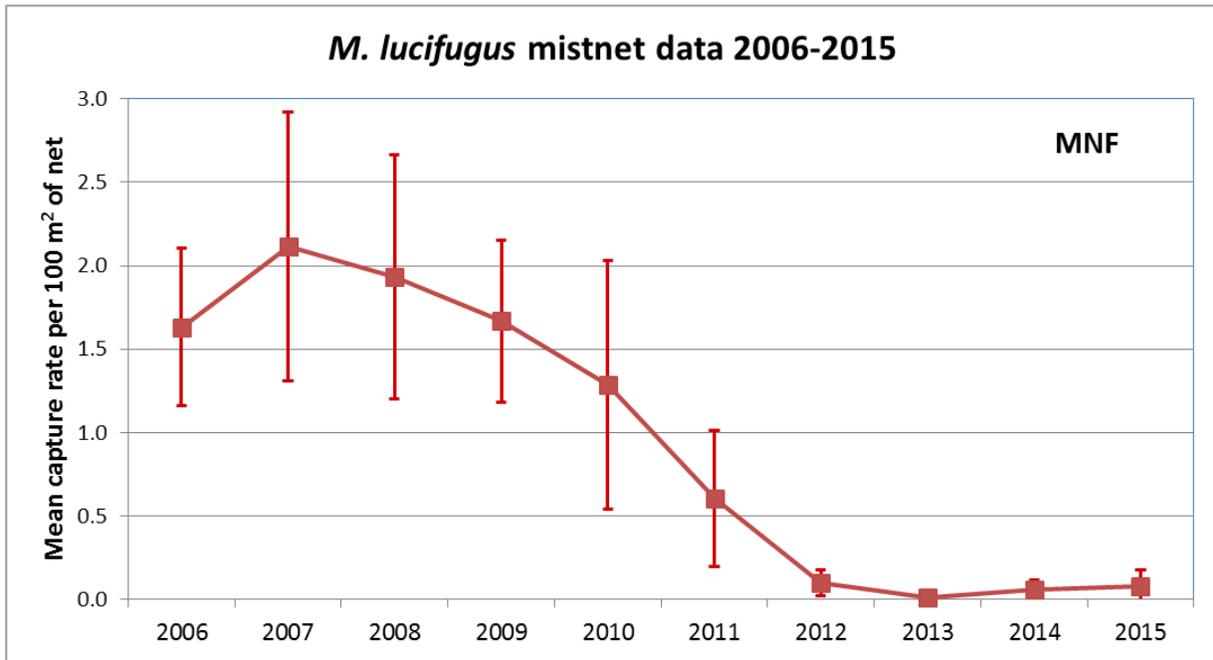


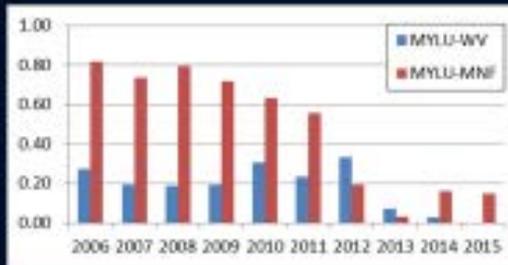
Figure 1. Changes in summer capture rates for five bat species on the Monongahela NF based on mist-netting surveys 2006-2015 (MYSE – northern long-eared bat; MYLU – little brown bat; EPFU – big brown bat; LABO – red bat; PESU – tri-colored bat).

Fig 2a. Little brown bat (changes across time with 95% confidence intervals):

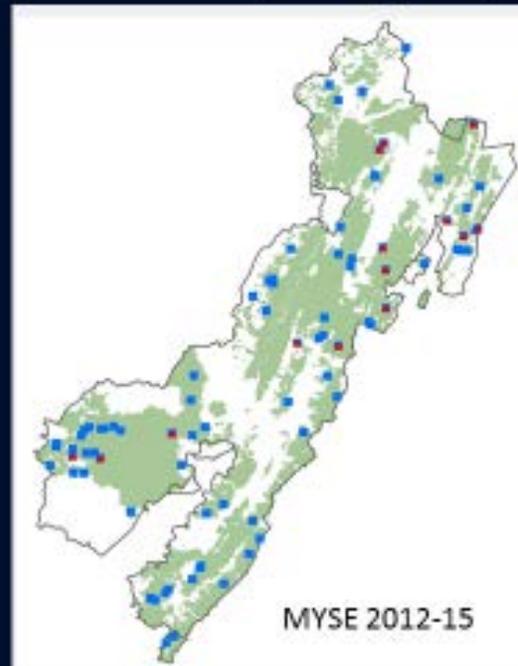
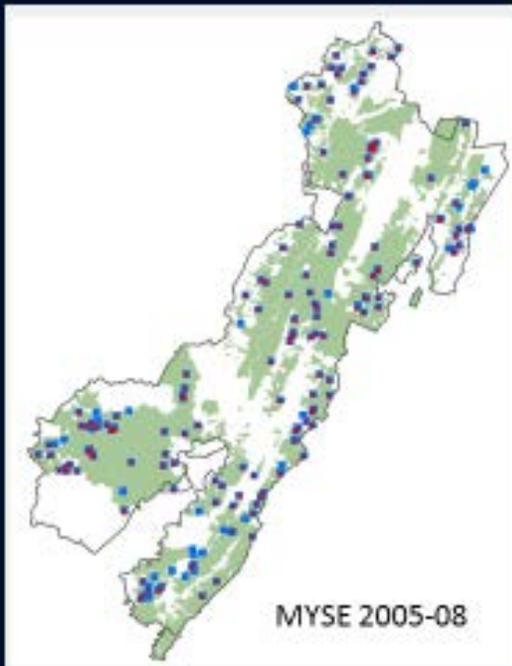


Changes in little brown bat captures pre- and post-WNS (2006-08 vs 2011-15)

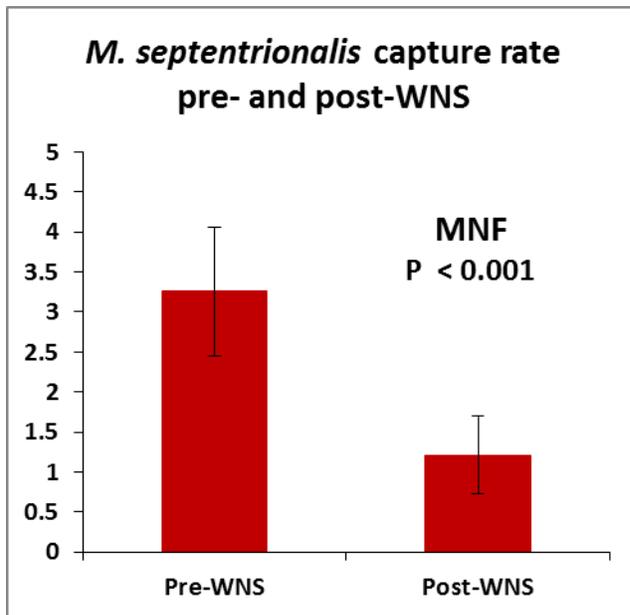
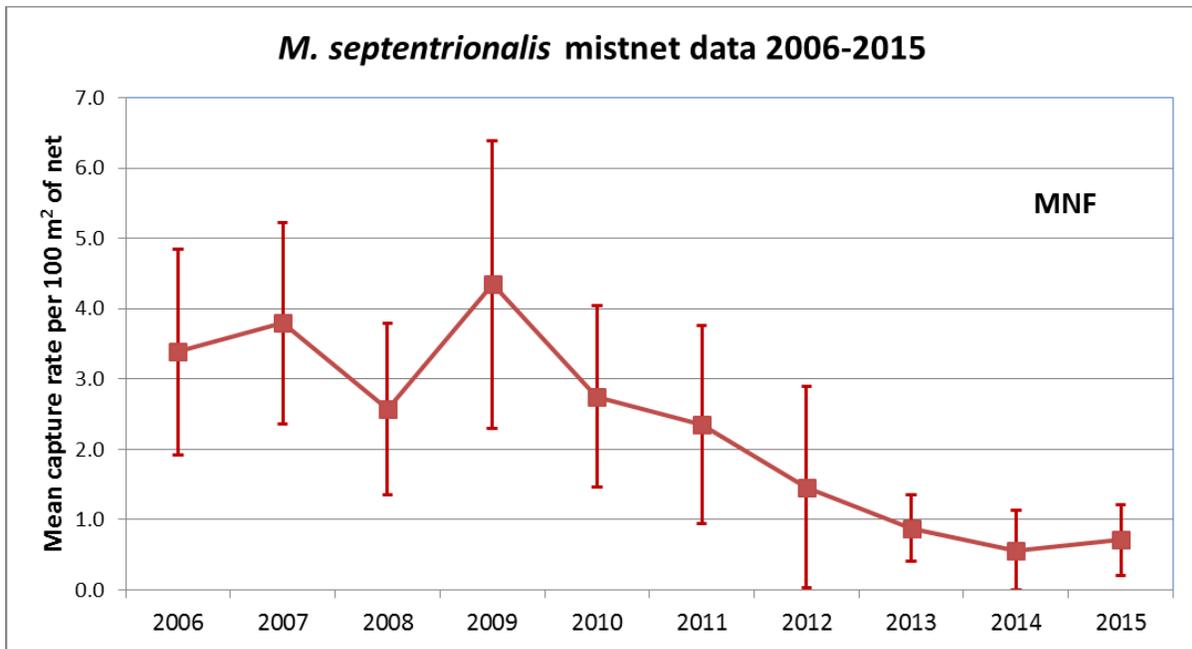
# MYLU distribution pre- and post-WNS



Proportion of sites with MYLU captures

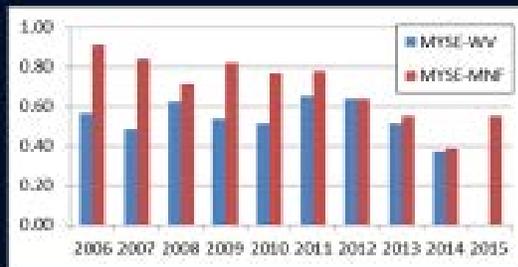


Northern long-eared bat (changes across time with 95% confidence intervals):

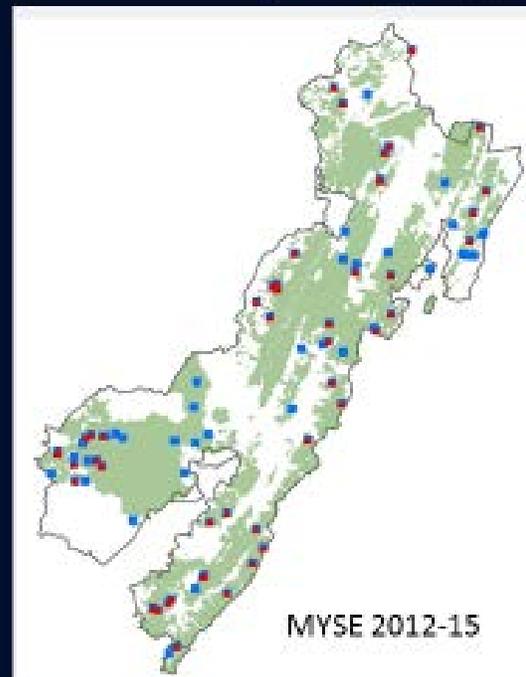
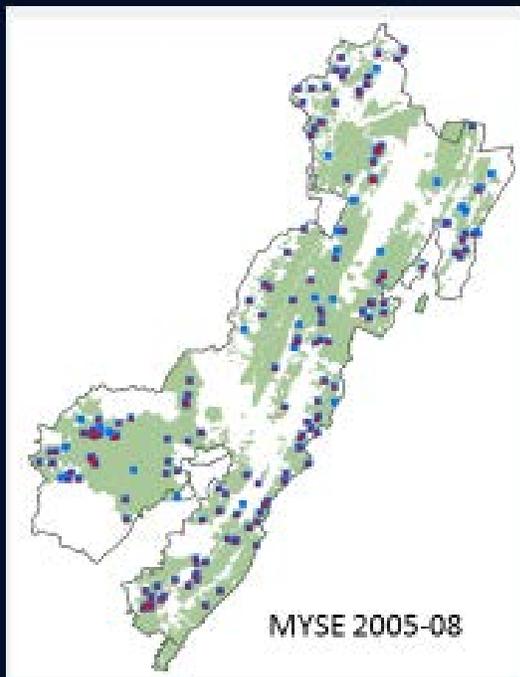


Changes in northern long-eared bat captures pre- and post-WNS (2006-08 vs 2011-15).

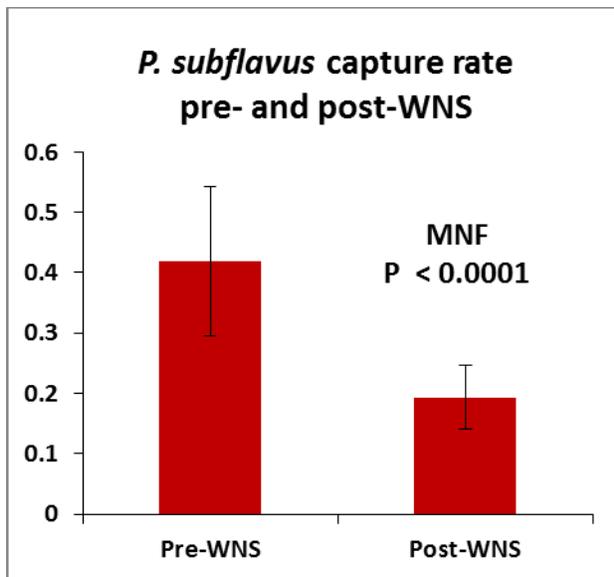
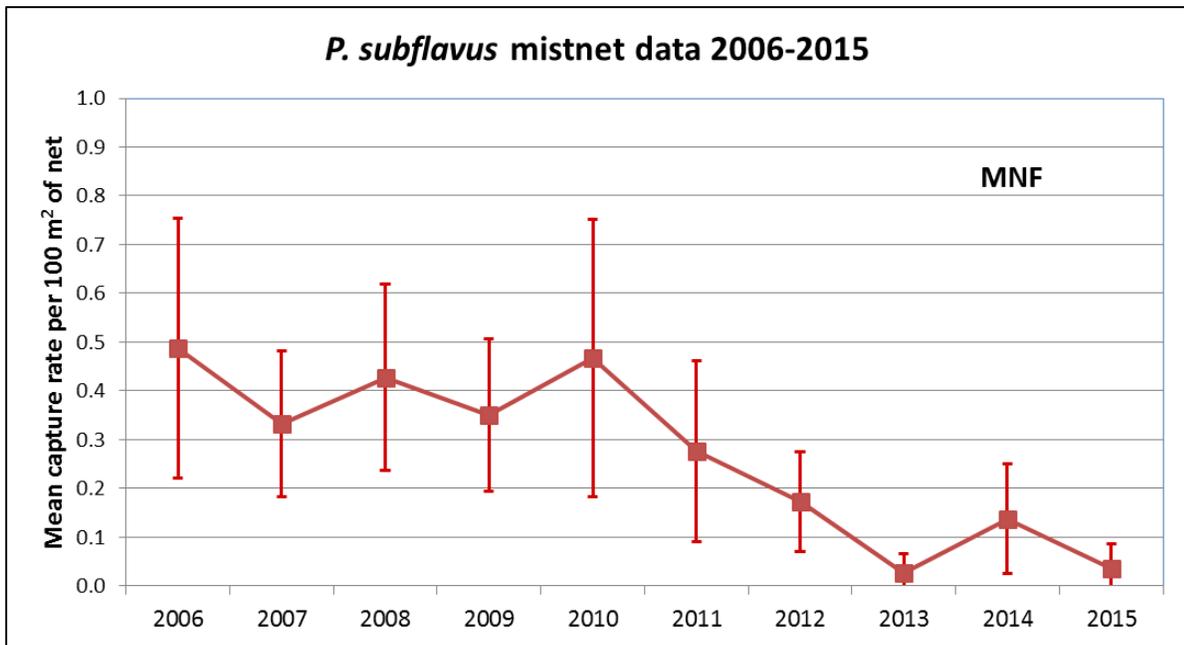
# MYSE distribution pre- and post-WNS



Proportion of sites with MYSE captures

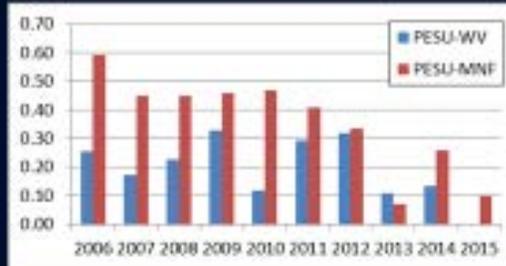


Tri-colored bat (changes across time with 95% confidence intervals):

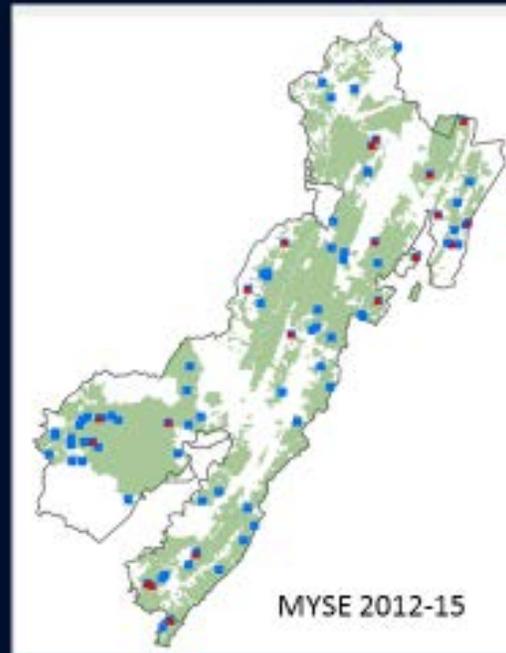
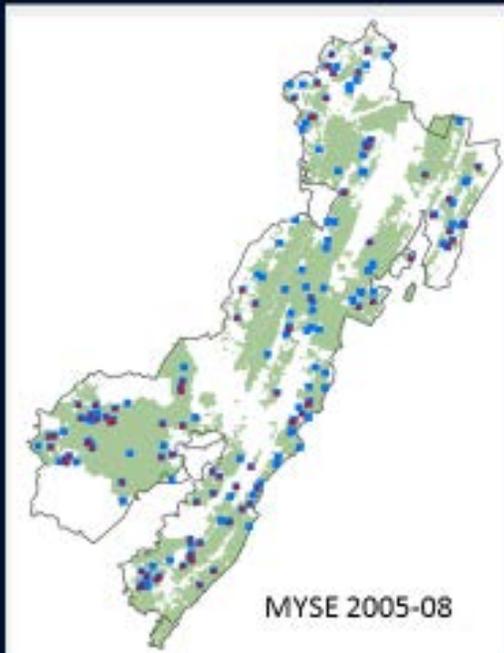


Changes in tri-colored bat captures pre- and post-WNS (2006-08 vs 2011-15).

## PESU distribution pre- and post-WNS



Proportion of sites with PESU captures



The tables below are from a workshop presentation on white nose syndrome in 2014, so are older data, and include mist-net data as well as results of hibernacula counts and acoustic transect.

Table 1. Post-WNS changes in hibernacula counts for three species (limited to caves with a pre-WNS count of  $\geq 100$ ). Pre-WNS data is from before 2009; post-WNS data is from 2010-2013/14.

| Hibernacula count data at WV caves |    |                             |          |                                   |               |
|------------------------------------|----|-----------------------------|----------|-----------------------------------|---------------|
| Species                            | N  | Range in hibernacula counts |          | Range in % decline by hibernacula | Avg % decline |
|                                    |    | Pre-WNS                     | Post-WNS |                                   |               |
| M. lucifugus                       | 15 | 146-24,011                  | 0-1,398  | 89-100                            | 97            |
| M. sodalis                         | 7  | 106-12,374                  | 18-2,540 | 70-91                             | 74            |
| P. subflavus                       | 14 | 102-1,800                   | 4-532    | 70-99                             | 91            |

Table 2. Comparison of calls detected based on analyses with two different software packages, SonoBat and Kaleidoscope. Percent change is positive if green, negative if red.

| Species            | Software     | Average calls/mi (N=31 routes) |       |       |       | Percent change from base year (2009) |      |      |      |
|--------------------|--------------|--------------------------------|-------|-------|-------|--------------------------------------|------|------|------|
|                    |              | 2009                           | 2010  | 2011  | 2012  | 2009                                 | 2010 | 2011 | 2012 |
| M. lucifugus       | SonoBat      | 0.151                          | 0.184 | 0.091 | 0.013 | 100                                  | 22   | 94   | 91   |
| M. lucifugus       | Kaleidoscope | 0.346                          | 0.475 | 0.238 | 0.082 | 100                                  | 37   | 31   | 76   |
| M. septentrionalis | SonoBat      | 0.004                          | 0.002 | 0.001 | 0.003 | 100                                  | 55   | 70   | 31   |
| M. septentrionalis | Kaleidoscope | 0.250                          | 0.188 | 0.128 | 0.048 | 100                                  | 75   | 49   | 81   |
| All Myotis spp     | SonoBat      | 0.511                          | 0.564 | 0.336 | 0.067 | 100                                  | 10   | 66   | 13   |
| All Myotis spp     | Kaleidoscope | 0.624                          | 0.702 | 0.390 | 0.139 | 100                                  | 12   | 62   | 22   |
| P. subflavus       | SonoBat      | 0.472                          | 0.460 | 0.374 | 0.294 | 100                                  | 3    | 21   | 38   |
| P. subflavus       | Kaleidoscope | 0.360                          | 0.383 | 0.343 | 0.241 | 100                                  | 6    | 5    | 33   |
| E. fuscus          | SonoBat      | 0.245                          | 0.431 | 0.468 | 0.521 | 100                                  | 76   | 91   | 112  |
| E. fuscus          | Kaleidoscope | 0.355                          | 0.458 | 0.518 | 0.515 | 100                                  | 29   | 46   | 45   |
| L. borealis        | SonoBat      | 0.245                          | 0.378 | 0.367 | 0.575 | 100                                  | 54   | 50   | 135  |
| L. borealis        | Kaleidoscope | 0.416                          | 0.422 | 0.345 | 0.367 | 100                                  | 1    | 83   | 88   |