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Memo to: Mike Armstrong, Andrew King and Robyn Niver

From: Mark Ford *Mark*

Subject: BCID 2.7

Contained are the results of the recently submitted BCID version 2.7d modification for the New York and West Virginia echolocation datasets. Again, per the request of the vendor, we ran this program with minimum DP in filter at .35. Based on U.S. Fish and Wildlife standards set forth for testing on the simulated full community New York dataset and West Virginia dataset, this version/setting **passed** for northern long-eared bats (*Myotis septentrionalis*) and Indiana bats (*Myotis sodalis*; Table 1) by denoting strong likelihood of presence when in fact they were present in the test dataset.

When northern long-eared bats were removed from the data, the submitted software correctly showed the species to not be present with confidence. In fact, at the individual pass level, the software assigned no passes to northern long-eared bats in the New York dataset and only one in the West Virginia dataset, which would be a rate well below the known misclassification rates among *Myotis*. Conversely, when Indiana bats were removed the same level of performance did not hold, as the software provided incorrect false positives for New York ($p = 0.00004$) with 9 passes identified and for West Virginia ($p = 0.001$) with 6 passes as Indiana bats. Work to address false positive rates for Indiana bats should be a priority in future software versions. Additionally, it appears eastern red bats (*Lasiurus borealis*) are being incorrectly identified as Myotids with some frequency.

cc: A. Silvis

Table 1. Comparison of post-identification per species confidence (*p*) from maximum likelihood estimator (see program specifications for details) of known echolocation pulses for BCID 2.7d with minimum DP in filter at .35 for simulated New York and West Virginia datasets based on Ford et al. (2011, 2005).

Species New York	*p*-value	actually present	identified by software	sensitivity	specificity
EPFU	< 0.0001	28	21	0.73078	0.9902
LABO	< 0.0001	51	25	0.8182	0.9663
LACI	< 0.0001	21	22	0.94118	0.9718
LANO	< 0.0001	9	10	0.7000	0.9863
MYLE	< 0.0001	7	8	0.8000	1
MYLU	< 0.0001	68	79	0.8090	0.9574
MYSE	< 0.0001	14	12	0.7333	0.9953
MYSO	< 0.0001	32	41	0.8518	0.9113
PESU	< 0.0001	8	13	0.9000	0.9818
Species West Virginia	***p*-value**	**actually present**	**identified by software**	**sensitivity**	**specificity**
EPFU	< 0.0001	26	24	0.7308	0.9796
LABO	< 0.0001	58	42	0.8500	0.9560
LACI	< 0.0001	22	21	0.9412	0.9756
LANO	< 0.0001	6	6	0.4000	0.9815
MYLE	< 0.04	5	3	0.3000	1
MYLU	< 0.0001	54	53	0.8333	0.9814
MYSE	< 0.0001	19	18	0.9412	0.9902
MYSO	< 0.0001	31	39	0.9629	0.9333
PESU	< 0.0001	11	17	0.8000	0.9758