



United States Department of The Interior
U.S. Geological Survey
Ecosystems Division

Virginia Cooperative Fish and Wildlife Research Unit
106 Cheatham Hall
Virginia Tech
Blacksburg, VA 24061

Fax: (540) 231-7580
Phone: (540) 231-5927
Email: wmford@vt.edu

April 8, 2019

To: Andrew King, Mike Armstrong, and Robyn Niver

From: Mark Ford, Virginia Unit Leader *Mark*

Subject: 2019 BCID 2.7d Re-test

Below are the returned MLE p-values on the estimates of presence or absence of bat community composition datasets (also with runs of northern long-eared bats *Myotis septentrionalis* removed or Indiana bats *Myotis sodalis* removed) for default and the minimum discriminant probability setting of 0.35 over ten randomly generated test libraries as well as associated producer's and user's accuracy for the datasets that retained northern long-eared bats and Indiana bats. Although both settings would pass for the complete datasets, the number of test runs with false positives and false negatives when northern long-eared bats or Indiana bats were removed would not be sufficient to meet performance standards set by U.S. Fish and Wildlife Service. I would note, however, the remarkably good performance relative to the silver-haired bat (*Lasionycteris noctivagans*; LANO) and the eastern small-footed bat (*Myotis leibii*; MYLE).

cc: A. Silvis

TEST SUMMARY: BCID 2.7d

SETTING: DEFAULT

TEST LIBRARY	MYSE			MYSO		
	Test Set			Test Set		
	ALL	NO MYSE	NO MYSO	ALL	NO MYSE	NO MYSO
1		false positive				false positive
2		false positive				false positive
3		false positive				false positive
4		false positive				false positive
5		false positive				false positive
6		false positive				false positive
7		false positive				false positive
8		false positive				false positive
9		false positive				false positive
10		false positive				false positive
No. Correct:	10	0	10	10	10	0
% Correct:	100%	0%	100%	100%	100%	0%

SETTING: MIN DP = 0.35

TEST LIBRARY	MYSE			MYSO		
	Test Set			Test Set		
	ALL	NO MYSE	NO MYSO	ALL	NO MYSE	NO MYSO
1			false negative		false negative	
2			false negative		false negative	
3			false negative		false negative	
4			false negative		false negative	
5		false positive	false negative			
6			false negative		false negative	
7			false negative			
8			false negative		false negative	
9			false negative		false negative	
10			false negative		false negative	
No. Correct:	10	9	0	10	2	0
% Correct:	100%	90%	0%	100%	20%	0%

Table 1. BCID 2.7d results at the default settings. For northern long-eared bats (*Myotis septentrionalis*; MYSE) and Indiana bats (*Myotis sodalis*; MYSO), green shading indicates correct classification whereas red shading represents incorrect classification, i.e., false positive or false negative relative to the U.S. Fish and Wildlife Service testing standard.

Default c:/users/cnrcommonaccess/documents/usgs software testing/call library/software test sets/software test sets 2019-03-15\test 10\all\														
ID	EPFU	LANO	LABO	LACI	MYAU	MYGR	MYLE	MYLU	MYSE	MYSO	NYHU	PESU	CORA	UNK N
N	45	21	66	9	23	18	11	80	29	73	45	44	4	7
%	9.47	4.42	13.89	1.89	4.84	3.79	2.32	16.84	6.11	15.37	9.47	9.26	0.84	1.47
MLE (p)	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	
c:/users/cnrcommonaccess/documents/usgs software testing/call library/software test sets/software test sets 2019-03-15\test 10\no MYSE\														
ID	EPFU	LANO	LABO	LACI	MYAU	MYGR	MYLE	MYLU	MYSE	MYSO	NYHU	PESU	CORA	UNK N
N	45	21	66	9	22	18	11	77	3	68	45	44	4	7
%	10.23	4.77	15.00	2.05	5.00	4.09	2.50	17.50	0.68	15.45	10.23	10.00	0.91	1.59
MLE (p)	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	
c:/users/cnrcommonaccess/documents/usgs software testing/call library/software test sets/software test sets 2019-03-15\test 10\no MYSO\														
ID	EPFU	LANO	LABO	LACI	MYAU	MYGR	MYLE	MYLU	MYSE	MYSO	NYHU	PESU	CORA	UNK N
N	45	21	66	9	23	18	11	72	28	29	45	44	4	7
%	10.66	4.98	15.64	2.13	5.45	4.27	2.61	17.06	6.64	6.87	10.66	10.43	0.95	1.66
MLE (p)	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	
c:/users/cnrcommonaccess/documents/usgs software testing/call library/software test sets/software test sets 2019-03-15\test 1\all\														
ID	EPFU	LANO	LABO	LACI	MYAU	MYGR	MYLE	MYLU	MYSE	MYSO	NYHU	PESU	CORA	UNK N
N	40	15	72	14	27	14	10	88	37	84	42	46	2	4
%	8.08	3.03	14.55	2.83	5.45	2.83	2.02	17.78	7.47	16.97	8.48	9.29	0.40	0.81
MLE (p)	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	
c:/users/cnrcommonaccess/documents/usgs software testing/call library/software test sets/software test sets 2019-03-15\test 1\no MYSE\														

ID	EPFU	LANO	LABO	LACI	MYAU	MYGR	MYLE	MYLU	MYSE	MYSO	NYHU	PESU	CORA	UNK N
N	40	15	72	14	27	14	10	85	3	81	42	46	2	4
%	8.79	3.30	15.82	3.08	5.93	3.08	2.20	18.68	0.66	17.80	9.23	10.11	0.44	0.88
MLE (p)	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	
c:/users/cnrcommonaccess/documents/usgs software testing/call library/software test sets/software test sets 2019-03-15\test 1\no MYSO\														
ID	EPFU	LANO	LABO	LACI	MYAU	MYGR	MYLE	MYLU	MYSE	MYSO	NYHU	PESU	CORA	UNK N
N	40	15	72	14	26	14	10	80	37	35	42	46	2	4
%	9.15	3.43	16.48	3.20	5.95	3.20	2.29	18.31	8.47	8.01	9.61	10.53	0.46	0.92
MLE (p)	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	
c:/users/cnrcommonaccess/documents/usgs software testing/call library/software test sets/software test sets 2019-03-15\test 2\all\														
ID	EPFU	LANO	LABO	LACI	MYAU	MYGR	MYLE	MYLU	MYSE	MYSO	NYHU	PESU	CORA	UNK N
N	45	12	74	15	19	20	10	71	31	86	50	42	1	7
%	9.32	2.48	15.32	3.11	3.93	4.14	2.07	14.70	6.42	17.81	10.35	8.70	0.21	1.45
MLE (p)	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	
c:/users/cnrcommonaccess/documents/usgs software testing/call library/software test sets/software test sets 2019-03-15\test 2\no MYSE\														
ID	EPFU	LANO	LABO	LACI	MYAU	MYGR	MYLE	MYLU	MYSE	MYSO	NYHU	PESU	CORA	UNK N
N	45	12	74	15	19	20	10	68	4	80	50	42	1	7
%	10.07	2.68	16.55	3.36	4.25	4.47	2.24	15.21	0.89	17.90	11.19	9.40	0.22	1.57
MLE (p)	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	
c:/users/cnrcommonaccess/documents/usgs software testing/call library/software test sets/software test sets 2019-03-15\test 2\no MYSO\														
ID	EPFU	LANO	LABO	LACI	MYAU	MYGR	MYLE	MYLU	MYSE	MYSO	NYHU	PESU	CORA	UNK N
N	45	12	74	15	18	20	10	67	31	36	50	42	1	7
%	10.51	2.80	17.29	3.50	4.21	4.67	2.34	15.65	7.24	8.41	11.68	9.81	0.23	1.64
MLE (p)	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	
c:/users/cnrcommonaccess/documents/usgs software testing/call library/software test sets/software test sets 2019-03-15\test 3\all\														

ID	EPFU	LANO	LABO	LACI	MYAU	MYGR	MYLE	MYLU	MYSE	MYSO	NYHU	PESU	CORA	UNK N
N	44	16	67	12	26	15	10	77	32	86	50	45	1	4
%	9.07	3.30	13.81	2.47	5.36	3.09	2.06	15.88	6.60	17.73	10.31	9.28	0.21	0.82
MLE (p)	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	
c:/users/cnrcommonaccess/documents/usgs software testing/call library/software test sets/software test sets 2019-03-15\test 3\no MYSE\														
ID	EPFU	LANO	LABO	LACI	MYAU	MYGR	MYLE	MYLU	MYSE	MYSO	NYHU	PESU	CORA	UNK N
N	44	16	67	12	26	15	10	75	4	83	50	45	1	4
%	9.73	3.54	14.82	2.65	5.75	3.32	2.21	16.59	0.88	18.36	11.06	9.96	0.22	0.88
MLE (p)	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	
c:/users/cnrcommonaccess/documents/usgs software testing/call library/software test sets/software test sets 2019-03-15\test 3\no MYSO\														
ID	EPFU	LANO	LABO	LACI	MYAU	MYGR	MYLE	MYLU	MYSE	MYSO	NYHU	PESU	CORA	UNK N
N	44	16	67	12	26	15	10	73	31	33	50	45	1	4
%	10.30	3.75	15.69	2.81	6.09	3.51	2.34	17.10	7.26	7.73	11.71	10.54	0.23	0.94
MLE (p)	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	
c:/users/cnrcommonaccess/documents/usgs software testing/call library/software test sets/software test sets 2019-03-15\test 4\all\														
ID	EPFU	LANO	LABO	LACI	MYAU	MYGR	MYLE	MYLU	MYSE	MYSO	NYHU	PESU	UNKN	
N	46	17	69	16	22	18	10	76	33	75	40	43	7	
%	9.75	3.60	14.62	3.39	4.66	3.81	2.12	16.10	6.99	15.89	8.47	9.11	1.48	
MLE (p)	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001		
c:/users/cnrcommonaccess/documents/usgs software testing/call library/software test sets/software test sets 2019-03-15\test 4\no MYSE\														
ID	EPFU	LANO	LABO	LACI	MYAU	MYGR	MYLE	MYLU	MYSE	MYSO	NYHU	PESU	UNKN	
N	46	17	69	16	22	18	9	75	5	70	40	43	7	
%	10.53	3.89	15.79	3.66	5.03	4.12	2.06	17.16	1.14	16.02	9.15	9.84	1.60	
MLE (p)	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001		
c:/users/cnrcommonaccess/documents/usgs software testing/call library/software test sets/software test sets 2019-03-15\test 4\no MYSO\														

ID	EPFU	LANO	LABO	LACI	MYAU	MYGR	MYLE	MYLU	MYSE	MYSO	NYHU	PESU	UNKN	
N	46	17	69	16	22	18	10	71	33	30	40	43	7	
%	10.90	4.03	16.35	3.79	5.21	4.27	2.37	16.82	7.82	7.11	9.48	10.19	1.66	
MLE (p)	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001		
c:/users/cnrcommonaccess/documents/usgs software testing/call library/software test sets/software test sets 2019-03-15\test 5\all\														
ID	EPFU	LANO	LABO	LACI	MYAU	MYGR	MYLE	MYLU	MYSE	MYSO	NYHU	PESU	CORA	UNKN
N	42	16	69	13	19	19	10	75	39	97	45	44	3	4
%	8.48	3.23	13.94	2.63	3.84	3.84	2.02	15.15	7.88	19.60	9.09	8.89	0.61	0.81
MLE (p)	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	
c:/users/cnrcommonaccess/documents/usgs software testing/call library/software test sets/software test sets 2019-03-15\test 5\no MYSE\														
ID	EPFU	LANO	LABO	LACI	MYAU	MYGR	MYLE	MYLU	MYSE	MYSO	NYHU	PESU	CORA	UNKN
N	42	16	69	13	18	19	10	73	7	93	45	44	3	4
%	9.21	3.51	15.13	2.85	3.95	4.17	2.19	16.01	1.54	20.39	9.87	9.65	0.66	0.88
MLE (p)	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	
c:/users/cnrcommonaccess/documents/usgs software testing/call library/software test sets/software test sets 2019-03-15\test 5\no MYSO\														
ID	EPFU	LANO	LABO	LACI	MYAU	MYGR	MYLE	MYLU	MYSE	MYSO	NYHU	PESU	CORA	UNKN
N	42	16	69	13	19	19	10	71	38	40	45	44	3	4
%	9.70	3.70	15.94	3.00	4.39	4.39	2.31	16.40	8.78	9.24	10.39	10.16	0.69	0.92
MLE (p)	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	
c:/users/cnrcommonaccess/documents/usgs software testing/call library/software test sets/software test sets 2019-03-15\test 6\all\														
ID	EPFU	LANO	LABO	LACI	MYAU	MYGR	MYLE	MYLU	MYSE	MYSO	NYHU	PESU	CORA	UNKN
N	40	15	63	16	29	9	10	80	27	85	48	38	2	4
%	8.58	3.22	13.52	3.43	6.22	1.93	2.15	17.17	5.79	18.24	10.30	8.15	0.43	0.86
MLE (p)	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	
c:/users/cnrcommonaccess/documents/usgs software testing/call library/software test sets/software test sets 2019-03-15\test 6\no MYSE\														

ID	EPFU	LANO	LABO	LACI	MYAU	MYGR	MYLE	MYLU	MYSE	MYSO	NYHU	PESU	CORA	UNK N
N	40	15	63	16	28	9	10	79	3	78	48	38	2	4
%	9.24	3.46	14.55	3.70	6.47	2.08	2.31	18.24	0.69	18.01	11.09	8.78	0.46	0.92
MLE (p)	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	
c:/users/cnrcommonaccess/documents/usgs software testing/call library/software test sets/software test sets 2019-03-15\test 6\no MYSO\														
ID	EPFU	LANO	LABO	LACI	MYAU	MYGR	MYLE	MYLU	MYSE	MYSO	NYHU	PESU	CORA	UNK N
N	40	15	63	16	29	9	10	72	26	35	48	38	2	4
%	9.83	3.69	15.48	3.93	7.13	2.21	2.46	17.69	6.39	8.60	11.79	9.34	0.49	0.98
MLE (p)	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	
c:/users/cnrcommonaccess/documents/usgs software testing/call library/software test sets/software test sets 2019-03-15\test 7\all\														
ID	EPFU	LANO	LABO	LACI	MYAU	MYGR	MYLE	MYLU	MYSE	MYSO	NYHU	PESU	CORA	UNK N
N	47	13	66	16	26	13	12	83	29	80	54	42	3	6
%	9.59	2.65	13.47	3.27	5.31	2.65	2.45	16.94	5.92	16.33	11.02	8.57	0.61	1.22
MLE (p)	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	
c:/users/cnrcommonaccess/documents/usgs software testing/call library/software test sets/software test sets 2019-03-15\test 7\no MYSE\														
ID	EPFU	LANO	LABO	LACI	MYAU	MYGR	MYLE	MYLU	MYSE	MYSO	NYHU	PESU	CORA	UNK N
N	47	13	66	16	25	13	11	80	4	77	54	42	3	6
%	10.28	2.84	14.44	3.50	5.47	2.84	2.41	17.51	0.88	16.85	11.82	9.19	0.66	1.31
MLE (p)	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	
c:/users/cnrcommonaccess/documents/usgs software testing/call library/software test sets/software test sets 2019-03-15\test 7\no MYSO\														
ID	EPFU	LANO	LABO	LACI	MYAU	MYGR	MYLE	MYLU	MYSE	MYSO	NYHU	PESU	CORA	UNK N
N	47	13	66	16	26	13	12	77	28	23	54	42	3	6
%	11.03	3.05	15.49	3.76	6.10	3.05	2.82	18.08	6.57	5.40	12.68	9.86	0.70	1.41
MLE (p)	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	
c:/users/cnrcommonaccess/documents/usgs software testing/call library/software test sets/software test sets 2019-03-15\test 8\all\														

ID	EPFU	LANO	LABO	LACI	MYAU	MYGR	MYLE	MYLU	MYSE	MYSO	NYHU	PESU	CORA	UNK N
N	51	14	68	10	29	13	13	74	28	80	51	40	2	10
%	10.56	2.90	14.08	2.07	6.00	2.69	2.69	15.32	5.80	16.56	10.56	8.28	0.41	2.07
MLE (p)	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	
c:/users/cnrcommonaccess/documents/usgs software testing/call library/software test sets/software test sets 2019-03-15\test 8\no MYSE\														
ID	EPFU	LANO	LABO	LACI	MYAU	MYGR	MYLE	MYLU	MYSE	MYSO	NYHU	PESU	CORA	UNK N
N	51	14	68	10	28	13	12	71	5	77	51	40	2	10
%	11.28	3.10	15.04	2.21	6.19	2.88	2.65	15.71	1.11	17.04	11.28	8.85	0.44	2.21
MLE (p)	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	
c:/users/cnrcommonaccess/documents/usgs software testing/call library/software test sets/software test sets 2019-03-15\test 8\no MYSO\														
ID	EPFU	LANO	LABO	LACI	MYAU	MYGR	MYLE	MYLU	MYSE	MYSO	NYHU	PESU	CORA	UNK N
N	51	14	68	10	29	13	13	70	27	29	51	40	2	10
%	11.94	3.28	15.93	2.34	6.79	3.04	3.04	16.39	6.32	6.79	11.94	9.37	0.47	2.34
MLE (p)	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	
c:/users/cnrcommonaccess/documents/usgs software testing/call library/software test sets/software test sets 2019-03-15\test 9\all\														
ID	EPFU	LANO	LABO	LACI	MYAU	MYGR	MYLE	MYLU	MYSE	MYSO	NYHU	PESU	CORA	UNK N
N	46	18	69	11	20	20	10	80	38	84	52	45	2	8
%	9.15	3.58	13.72	2.19	3.98	3.98	1.99	15.90	7.55	16.70	10.34	8.95	0.40	1.59
MLE (p)	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	
c:/users/cnrcommonaccess/documents/usgs software testing/call library/software test sets/software test sets 2019-03-15\test 9\no MYSE\														
ID	EPFU	LANO	LABO	LACI	MYAU	MYGR	MYLE	MYLU	MYSE	MYSO	NYHU	PESU	CORA	UNK N
N	46	18	69	11	20	20	10	77	6	81	52	45	2	8
%	9.89	3.87	14.84	2.37	4.30	4.30	2.15	16.56	1.29	17.42	11.18	9.68	0.43	1.72
MLE (p)	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	
c:/users/cnrcommonaccess/documents/usgs software testing/call library/software test sets/software test sets 2019-03-15\test 9\no MYSO\														

Table 2. BCID 2.7d producer's and user's accuracy for results at the default setting using only datasets inclusive of both northern long-eared bats (*Myotis septentrionalis*; MYSE) and Indiana bats (*Myotis sodalis*; MYSO).

Discrim 0.0	Producer's Accuracy	SD	Common Mis-ID	User's Accuracy	SD	Common Mis-ID
CORA	0.5	0.29	NOID	0.64	0.5	MYLU/EPFU
EPFU	0.88	0.07	MYAU	0.63	0.48	NOID/LANO
LABO	0.59	0.05	NYHU	0.58	0.49	NYHU
LACI	0.57	0.19	NOID	0.44	0.5	NOID/LANO
LANO	0.6	0.07	EPFU	0.79	0.41	LACI
MYAU	0.02	0.03	LABO	0.02	0.14	MYGR
MYGR	0.4	0.14	MYAU	0.75	0.43	NOID/LANO
MYLE	0.41	0.09	MYSO/NOID	0.94	0.24	NONE
MYLU	0.52	0.06	MYSO/NYHU	0.73	0.44	MYAU/MYSE
MYSE	0.55	0.04	NOID	0.82	0.38	MYSO
MYSO	0.89	0.03	MYLU	0.55	0.5	MYLU/MYLE
NOID	0.91	0.01	LACI/PESU	0.9	0.3	MYSE/MYLU
NYHU	0.74	0.07	LABO	0.45	0.5	MYLU/LABO
PESU	0.79	0.06	LABO	0.63	0.48	NOID/MAU

Table 3. BCID 2.7d results at the minimum discriminant probability setting of 0.35. For northern long-eared bats (*Myotis septentrionalis*; MYSE) and Indiana bats (*Myotis sodalis*; MYSO), green shading indicates correct classification whereas red shading represents incorrect classification, i.e., false positive or false negative relative to the U.S. Fish and Wildlife Service testing standard.

0.35

c:/users/cnrcommonaccess/documents/usgs software testing/call library/software test sets/software test sets 2019-03-15\test 10\all\

ID	EPFU	LANO	LABO	LACI	MYAU	MYGR	MYLE	MYLU	MYSE	MYSO	NYHU	PESU	CORA	UNKN
N	23	10	17	4	16	8	7	38	21	50	27	32	4	218
%	4.84	2.11	3.58	0.84	3.37	1.68	1.47	8	4.42	10.53	5.68	6.74	0.84	45.89
MLE (p)	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001

c:/users/cnrcommonaccess/documents/usgs software testing/call library/software test sets/software test sets 2019-03-15\test 10\no MYSE\

ID	EPFU	LANO	LABO	LACI	MYAU	MYGR	MYLE	MYLU	MYSE	MYSO	NYHU	PESU	CORA	UNKN
N	23	10	17	4	16	8	7	36	1	46	27	32	4	209
%	5.23	2.27	3.86	0.91	3.64	1.82	1.59	8.18	0.23	10.45	6.14	7.27	0.91	47.5
MLE (p)	0.999999	0.999999	0.999999	0.999999	0.999999	0.999999	0.999999	0.999999	0.999999	0.999999	0.999999	0.000001	0.999999	0.999999

c:/users/cnrcommonaccess/documents/usgs software testing/call library/software test sets/software test sets 2019-03-15\test 10\no MYSO\

ID	EPFU	LANO	LABO	LACI	MYAU	MYGR	MYLE	MYLU	MYSE	MYSO	NYHU	PESU	CORA	UNKN
N	23	10	17	4	16	8	7	36	20	14	27	32	4	204
%	5.45	2.37	4.03	0.95	3.79	1.9	1.66	8.53	4.74	3.32	6.4	7.58	0.95	48.34
MLE (p)	0.999999	0.999999	0.999999	0.999999	0.999999	0.999999	0.999999	0.999999	0.999999	0.999999	0.999999	0.000001	0.999999	0.999999

c:/users/cnrcommonaccess/documents/usgs software testing/call library/software test sets/software test sets 2019-03-15\test 1\all\

ID	EPFU	LANO	LABO	LACI	MYAU	MYGR	MYLE	MYLU	MYSE	MYSO	NYHU	PESU	CORA	UNKN
N	17	9	21	12	18	6	7	40	30	53	26	34	2	220
%	3.43	1.82	4.24	2.42	3.64	1.21	1.41	8.08	6.06	10.71	5.25	6.87	0.4	44.44
MLE (p)	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001

c:/users/cnrcommonaccess/documents/usgs software testing/call library/software test sets/software test sets 2019-03-15\test 1\no MYSE\

ID	EPFU	LANO	LABO	LACI	MYAU	MYGR	MYLE	MYLU	MYSE	MYSO	NYHU	PESU	CORA	UNKN
N	17	9	21	12	18	6	7	39	1	50	26	34	2	213
%	3.74	1.98	4.62	2.64	3.96	1.32	1.54	8.57	0.22	10.99	5.71	7.47	0.44	46.81
MLE (p)	0.999999	0.999999	0.999999	0.999999	0.000001	0.999999	0.999999	0.000001	0.999999	0.999999	0.999999	0.000001	0.999999	0.999999

c:/users/cnrcommonaccess/documents/usgs software testing/call library/software test sets/software test sets 2019-03-15\test 1\no MYSO\

ID	EPFU	LANO	LABO	LACI	MYAU	MYGR	MYLE	MYLU	MYSE	MYSO	NYHU	PESU	CORA	UNKN
N	17	9	21	12	17	6	7	37	30	17	26	34	2	202
%	3.89	2.06	4.81	2.75	3.89	1.37	1.6	8.47	6.86	3.89	5.95	7.78	0.46	46.22

MLE (p) 0.999999 0.999999 0.999999 0.999999 0.000001 0.999999 0.999999 0.000001 0.999999 0.999999 0.999999 0.000001 0.999999

c:/users/cnrcommonaccess/documents/usgs software testing/call library/software test sets/software test sets 2019-03-15\test 2\all\

ID	EPFU	LANO	LABO	LACI	MYAU	MYGR	MYLE	MYLU	MYSE	MYSO	NYHU	PESU	CORA	UNKN
N	21	8	23	13	14	13	7	33	24	55	32	34	1	205
%	4.35	1.66	4.76	2.69	2.9	2.69	1.45	6.83	4.97	11.39	6.63	7.04	0.21	42.44
MLE (p)	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001

c:/users/cnrcommonaccess/documents/usgs software testing/call library/software test sets/software test sets 2019-03-15\test 2\no MYSE\

ID	EPFU	LANO	LABO	LACI	MYAU	MYGR	MYLE	MYLU	MYSO	NYHU	PESU	CORA	UNKN	MYSE
N	21	8	23	13	14	13	7	32	51	32	34	1	198	
%	4.7	1.79	5.15	2.91	3.13	2.91	1.57	7.16	11.41	7.16	7.61	0.22	44.3	
MLE (p)	0.000001	0.999999	0.999999	0.000001	0.000001	0.999999	0.999999	0.000001	0.999999	0.000001	0.000001	0.999999		correct

c:/users/cnrcommonaccess/documents/usgs software testing/call library/software test sets/software test sets 2019-03-15\test 2\no MYSO\

IDENTIFICATION SUMMARY

ID	EPFU	LANO	LABO	LACI	MYAU	MYGR	MYLE	MYLU	MYSE	MYSO	NYHU	PESU	CORA	UNKN
N	21	8	23	13	13	13	7	31	24	15	32	34	1	193
%	4.91	1.87	5.37	3.04	3.04	3.04	1.64	7.24	5.61	3.5	7.48	7.94	0.23	45.09
MLE (p)	0.999999	0.999999	0.999999	0.000001	0.000001	0.999999	0.999999	0.999999	0.999999	0.999999	0.000001	0.000001	0.999999	

c:/users/cnrcommonaccess/documents/usgs software testing/call library/software test sets/software test sets 2019-03-15\test 3\all\

ID	EPFU	LANO	LABO	LACI	MYAU	MYGR	MYLE	MYLU	MYSE	MYSO	NYHU	PESU	CORA	UNKN
N	22	10	20	9	21	9	6	34	26	57	35	36	1	199
%	4.54	2.06	4.12	1.86	4.33	1.86	1.24	7.01	5.36	11.75	7.22	7.42	0.21	41.03
MLE (p)	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001

c:/users/cnrcommonaccess/documents/usgs software testing/call library/software test sets/software test sets 2019-03-15\test 3\no MYSE\

ID	EPFU	LANO	LABO	LACI	MYAU	MYGR	MYLE	MYLU	MYSE	MYSO	NYHU	PESU	CORA	UNKN
N	22	10	20	9	21	9	6	33	1	54	35	36	1	195
%	4.87	2.21	4.42	1.99	4.65	1.99	1.33	7.3	0.22	11.95	7.74	7.96	0.22	43.14
MLE (p)	0.000001	0.999999	0.999999	0.000001	0.000001	0.999999	0.999999	0.000001	0.999999	0.999999	0.000001	0.000001	0.999999	

c:/users/cnrcommonaccess/documents/usgs software testing/call library/software test sets/software test sets 2019-03-15\test 3\no MYSO\

IDENTIFICATION SUMMARY

ID	EPFU	LANO	LABO	LACI	MYAU	MYGR	MYLE	MYLU	MYSE	MYSO	NYHU	PESU	CORA	UNKN
N	22	10	20	9	21	9	6	34	25	16	35	36	1	183
%	5.15	2.34	4.68	2.11	4.92	2.11	1.41	7.96	5.85	3.75	8.2	8.43	0.23	42.86
MLE (p)	0.000001	0.999999	0.999999	0.999999	0.000001	0.999999	0.999999	0.000001	0.999999	0.999999	0.000001	0.000001	0.999999	

c:/users/cnrcommonaccess/documents/usgs software testing/call library/software test sets/software test sets 2019-03-15\test 4\all\

ID	EPFU	LANO	LABO	LACI	MYAU	MYGR	MYLE	MYLU	MYSE	MYSO	NYHU	PESU	UNKN
N	22	7	21	12	16	11	6	38	25	49	26	34	205
%	4.66	1.48	4.45	2.54	3.39	2.33	1.27	8.05	5.3	10.38	5.51	7.2	43.43
MLE (p)	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	

c:/users/cnrcommonaccess/documents/usgs software testing/call library/software test sets/software test sets 2019-03-15\test 4\no MYSE\

ID	EPFU	LANO	LABO	LACI	MYAU	MYGR	MYLE	MYLU	MYSE	MYSO	NYHU	PESU	UNKN
N	22	7	21	12	16	11	5	37	1	46	26	34	199
%	5.03	1.6	4.81	2.75	3.66	2.52	1.14	8.47	0.23	10.53	5.95	7.78	45.54
MLE (p)	0.999999	0.999999	0.999999	0.999999	0.999999	0.999999	0.999999	0.999999	0.999999	0.999999	0.999999	0.000001	

c:/users/cnrcommonaccess/documents/usgs software testing/call library/software test sets/software test sets 2019-03-15\test 4\no MYSO\

ID	EPFU	LANO	LABO	LACI	MYAU	MYGR	MYLE	MYLU	MYSE	MYSO	NYHU	PESU	UNKN
N	22	7	21	12	16	11	6	36	25	12	26	34	194
%	5.21	1.66	4.98	2.84	3.79	2.61	1.42	8.53	5.92	2.84	6.16	8.06	45.97
MLE (p)	0.999999	0.999999	0.999999	0.999999	0.999999	0.999999	0.999999	0.999999	0.999999	0.999999	0.999999	0.000001	

c:/users/cnrcommonaccess/documents/usgs software testing/call library/software test sets/software test sets 2019-03-15\test 5\all\

ID	EPFU	LANO	LABO	LACI	MYAU	MYGR	MYLE	MYLU	MYSE	MYSO	NYHU	PESU	CORA	UNKN
N	25	9	25	11	15	10	5	33	30	62	34	35	3	198
%	5.05	1.82	5.05	2.22	3.03	2.02	1.01	6.67	6.06	12.53	6.87	7.07	0.61	40
MLE (p)	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001

c:/users/cnrcommonaccess/documents/usgs software testing/call library/software test sets/software test sets 2019-03-15\test 5\no MYSE\

ID	EPFU	LANO	LABO	LACI	MYAU	MYGR	MYLE	MYLU	MYSE	MYSO	NYHU	PESU	CORA	UNKN
N	25	9	25	11	15	10	5	33	3	60	34	35	3	188
%	5.48	1.97	5.48	2.41	3.29	2.19	1.1	7.24	0.66	13.16	7.46	7.68	0.66	41.23
MLE (p)	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001

c:/users/cnrcommonaccess/documents/usgs software testing/call library/software test sets/software test sets 2019-03-15\test 5\no MYSO\

ID	EPFU	LANO	LABO	LACI	MYAU	MYGR	MYLE	MYLU	MYSE	MYSO	NYHU	PESU	CORA	UNKN
N	25	9	25	11	15	10	5	31	29	15	34	35	3	186
%	5.77	2.08	5.77	2.54	3.46	2.31	1.15	7.16	6.7	3.46	7.85	8.08	0.69	42.96
MLE (p)	0.000001	0.999999	0.000001	0.000001	0.000001	0.999999	0.999999	0.000001	0.999999	0.999999	0.000001	0.000001	0.999999	

c:/users/cnrcommonaccess/documents/usgs software testing/call library/software test sets/software test sets 2019-03-15\test 6\all\

ID	EPFU	LANO	LABO	LACI	MYAU	MYGR	MYLE	MYLU	MYSE	MYSO	NYHU	PESU	CORA	UNKN
N	16	9	17	13	19	5	7	38	23	59	32	32	2	194
%	3.43	1.93	3.65	2.79	4.08	1.07	1.5	8.15	4.94	12.66	6.87	6.87	0.43	41.63

MLE (p)	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001
c:/users/cnrcommonaccess/documents/usgs software testing/call library/software test sets/software test sets 2019-03-15\test 6\no MYSE\														
ID	EPFU	LANO	LABO	LACI	MYAU	MYGR	MYLE	MYLU	MYSE	MYSO	NYHU	PESU	CORA	UNKN
N	16	9	17	13	19	5	7	37	2	53	32	32	2	189
%	3.7	2.08	3.93	3	4.39	1.15	1.62	8.55	0.46	12.24	7.39	7.39	0.46	43.65
MLE (p)	0.999999	0.999999	0.999999	0.999999	0.000001	0.999999	0.999999	0.999999	0.999999	0.999999	0.999999	0.000001	0.999999	
c:/users/cnrcommonaccess/documents/usgs software testing/call library/software test sets/software test sets 2019-03-15\test 6\no MYSO\														
ID	EPFU	LANO	LABO	LACI	MYAU	MYGR	MYLE	MYLU	MYSE	MYSO	NYHU	PESU	CORA	UNKN
N	16	9	17	13	19	5	7	36	22	19	32	32	2	178
%	3.93	2.21	4.18	3.19	4.67	1.23	1.72	8.85	5.41	4.67	7.86	7.86	0.49	43.73
MLE (p)	0.999999	0.999999	0.999999	0.999999	0.000001	0.999999	0.999999	0.999999	0.999999	0.999999	0.999999	0.000001	0.999999	
c:/users/cnrcommonaccess/documents/usgs software testing/call library/software test sets/software test sets 2019-03-15\test 7\all\														
ID	EPFU	LANO	LABO	LACI	MYAU	MYGR	MYLE	MYLU	MYSE	MYSO	NYHU	PESU	CORA	UNKN
N	21	6	24	14	16	8	8	39	22	58	37	30	3	204
%	4.29	1.22	4.9	2.86	3.27	1.63	1.63	7.96	4.49	11.84	7.55	6.12	0.61	41.63
MLE (p)	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001
c:/users/cnrcommonaccess/documents/usgs software testing/call library/software test sets/software test sets 2019-03-15\test 7\no MYSE\														
ID	EPFU	LANO	LABO	LACI	MYAU	MYGR	MYLE	MYLU	MYSE	MYSO	NYHU	PESU	CORA	UNKN
N	21	6	24	14	16	8	7	38	1	55	37	30	3	197
%	4.6	1.31	5.25	3.06	3.5	1.75	1.53	8.32	0.22	12.04	8.1	6.56	0.66	43.11
MLE (p)	0.000001	0.999999	0.000001	0.000001	0.000001	0.999999	0.999999	0.000001	0.999999	0.000001	0.000001	0.000001	0.999999	
c:/users/cnrcommonaccess/documents/usgs software testing/call library/software test sets/software test sets 2019-03-15\test 7\no MYSO\														
ID	EPFU	LANO	LABO	LACI	MYAU	MYGR	MYLE	MYLU	MYSE	MYSO	NYHU	PESU	CORA	UNKN
N	21	6	24	14	16	8	8	38	21	12	37	30	3	188
%	4.93	1.41	5.63	3.29	3.76	1.88	1.88	8.92	4.93	2.82	8.69	7.04	0.7	44.13
MLE (p)	0.999999	0.999999	0.999999	0.000001	0.000001	0.999999	0.999999	0.000001	0.999999	0.999999	0.000001	0.000001	0.999999	
c:/users/cnrcommonaccess/documents/usgs software testing/call library/software test sets/software test sets 2019-03-15\test 8\all\														
ID	EPFU	LANO	LABO	LACI	MYAU	MYGR	MYLE	MYLU	MYSE	MYSO	NYHU	PESU	CORA	UNKN
N	23	8	21	8	22	4	9	33	21	51	32	34	2	215
%	4.76	1.66	4.35	1.66	4.55	0.83	1.86	6.83	4.35	10.56	6.63	7.04	0.41	44.51
MLE (p)	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001
c:/users/cnrcommonaccess/documents/usgs software testing/call library/software test sets/software test sets 2019-03-15\test 8\no MYSE\														
ID	EPFU	LANO	LABO	LACI	MYAU	MYGR	MYLE	MYLU	MYSE	MYSO	NYHU	PESU	CORA	UNKN

N	23	8	21	8	22	4	8	32	1	48	32	34	2	209
%	5.09	1.77	4.65	1.77	4.87	0.88	1.77	7.08	0.22	10.62	7.08	7.52	0.44	46.24
MLE														
(p)	0.999999	0.999999	0.999999	0.999999	0.000001	0.999999	0.999999	0.999999	0.999999	0.999999	0.999999	0.000001	0.999999	
c:/users/cnrcommonaccess/documents/usgs software testing/call library/software test sets/software test sets 2019-03-15\test 8\no MYSO\														
ID	EPFU	LANO	LABO	LACI	MYAU	MYGR	MYLE	MYLU	MYSE	MYSO	NYHU	PESU	CORA	UNKN
N	23	8	21	8	22	4	9	33	20	12	32	34	2	199
%	5.39	1.87	4.92	1.87	5.15	0.94	2.11	7.73	4.68	2.81	7.49	7.96	0.47	46.6
MLE														
(p)	0.999999	0.999999	0.999999	0.999999	0.000001	0.999999	0.999999	0.999999	0.999999	0.999999	0.999999	0.000001	0.999999	
c:/users/cnrcommonaccess/documents/usgs software testing/call library/software test sets/software test sets 2019-03-15\test 9\all\														
ID	EPFU	LANO	LABO	LACI	MYAU	MYGR	MYLE	MYLU	MYSE	MYSO	NYHU	PESU	CORA	UNKN
N	22	12	19	7	13	10	6	37	30	54	36	36	2	219
%	4.37	2.39	3.78	1.39	2.58	1.99	1.19	7.36	5.96	10.74	7.16	7.16	0.4	43.54
MLE														
(p)	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001
c:/users/cnrcommonaccess/documents/usgs software testing/call library/software test sets/software test sets 2019-03-15\test 9\no MYSE\														
ID	EPFU	LANO	LABO	LACI	MYAU	MYGR	MYLE	MYLU	MYSE	MYSO	NYHU	PESU	CORA	UNKN
N	22	12	19	7	13	10	6	35	2	52	36	36	2	213
%	4.73	2.58	4.09	1.51	2.8	2.15	1.29	7.53	0.43	11.18	7.74	7.74	0.43	45.81
MLE														
(p)	0.000001	0.000001	0.999999	0.999999	0.000001	0.999999	0.999999	0.000001	0.999999	0.999999	0.000001	0.000001	0.999999	
c:/users/cnrcommonaccess/documents/usgs software testing/call library/software test sets/software test sets 2019-03-15\test 9\no MYSO\														
ID	EPFU	LANO	LABO	LACI	MYAU	MYGR	MYLE	MYLU	MYSE	MYSO	NYHU	PESU	CORA	UNKN
N	22	12	19	7	13	10	6	35	29	12	36	36	2	204
%	4.97	2.71	4.29	1.58	2.93	2.26	1.35	7.9	6.55	2.71	8.13	8.13	0.45	46.05
MLE														
(p)	0.999999	0.999999	0.999999	0.999999	0.000001	0.999999	0.999999	0.000001	0.999999	0.999999	0.000001	0.000001	0.999999	

Table 4. BCID 2.7d producer's and user's accuracy for results at the minimum discriminant probability setting of 0.35 using only datasets inclusive of both northern long-eared bats (*Myotis septentrionalis*; MYSE) and Indiana bats (*Myotis sodalis*; MYSO).

Discrim	Producer's		Common	User's		Common
0.35	Accuracy	SD	Mis-ID	Accuracy	SD	Mis-ID
CORA	0.3	0.29	NOID	0.64	0.5	MYLU/EPFU
EPFU	0.52	0.1	NOID	0.78	0.41	NOID/LANO
LABO	0.2	0.05	NYHU	0.65	0.48	NYHU
LACI	0.42	0.22	NOID	0.41	0.49	NOID/LANO
LANO	0.41	0.08	EPFU	0.95	0.22	LACI
MYAU	0.02	0.04	MYSO/PESU	0.03	0.17	MYGR
MYGR	0.2	0.1	MYAU	0.78	0.42	NOID
MYLE	0.28	0.08	NOID/MYSO	0.95	0.21	NONE
MYLU	0.25	0.06	NOID/MYSE	0.76	0.43	MYAU/MYSE
MYSE	0.45	0.04	NOID/MYSO	0.95	0.21	MYSO
MYSO	0.71	0.06	NOID	0.69	0.46	MYLU/MYLE
NOID	0.91	0.01	LACI/PESU	0.89	0.3	MYSE/MYLU
NYHU	0.43	0.07	LABO	0.4	0.49	MYLU/LABO
PESU	0.71	0.07	NOID	0.71	0.46	NOID/MYAU