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To: Andrew King, Mike Armstrong, and Robyn Niver

From: Mark Ford, Virginia Unit Leader *Mark*

Subject: 2019 BCID 2.8a

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*; MYSE removed or Indiana bats *Myotis sodalis*: MYSO removed) for default and the minimum discriminant probability (MDP) setting of 0.35 over ten randomly generated test libraries as well as associated producer's and user's accuracy (Tables 2 and 4) for the datasets that retained MYSE and MYSO. Both settings passed for MYSO per the U.S. Fish and Wildlife Service standard in that the default setting contained no false absences and only one false presence in a dataset with MYSO files removed and the MDP 0.35 setting passed completely in all scenarios (Tables 1 and 3). However, both settings failed for MYSE with 3 and 5 false absences in the default and MDP 0.35 settings, respectively, for the "All" test sets containing both MYSE and MYSO files (Tables 1 and 3). Some test sets show no reported values for MYSE or other species, meaning the program noted their complete absence. Similarly, the default and MDP 0.35 settings had 2 and 3 false absences, respectively, in datasets with MYSO removed (i.e., "No MYSO"), but MYSE retained (Tables 1 and 3). Nonetheless, in many cases MLE p -values were only minimally higher than the U.S. Fish and Wildlife Service $p \leq 0.05$ threshold. 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 version 2.8a

SETTING: DEFAULT

TEST LIBRARY	MYSE			MYSO		
	Test Set			Test Set		
	ALL	NO MYSE	NO MYSO	ALL	NO MYSE	NO MYSO
1						
2						false positive
3						
4						
5						
6	false negative		false negative			
7	false negative					
8	false negative		false negative			
9						
10						
No. Correct:	7	10	8	10	10	9
% Correct:	70%	100%	80%	100%	100%	90%

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					
2						
3						
4						
5						
6	false negative		false negative			
7	false negative		false negative			
8	false negative		false negative			
9						
10	false negative					
No. Correct:	5	10	7	10	10	10
% Correct:	50%	100%	70%	100%	100%	100%

Table 1. BCID 2.8 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.

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ID	EPFU	LANO	LABO	LACI	MYAU	MYGR	MYLE	MYLU	MYSE	MYSO	NYHU	PESU	CORA	UNKN
N	38	14	52	9	18	16	1	70	20	61	37	30	4	5
%	10.13	3.73	13.87	2.40	4.80	4.27	0.27	18.67	5.33	16.27	9.87	8.00	1.07	1.33
MLE (p)	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.999999	0.000001	0.009610	0.000001	0.000001	0.000001	0.042727	

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

ID	EPFU	LANO	LABO	LACI	MYAU	MYGR	MYLE	MYLU	MYSE	MYSO	NYHU	PESU	CORA	UNKN
N	38	14	52	9	17	17	2	67	2	57	37	30	4	5
%	10.83	3.99	14.81	2.56	4.84	4.84	0.57	19.09	0.57	16.24	10.54	8.55	1.14	1.42
MLE (p)	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.999999	0.000001	0.999999	0.000001	0.000001	0.000001	0.024470	

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ID	EPFU	LANO	LABO	LACI	MYAU	MYGR	MYLE	MYLU	MYSE	MYSO	NYHU	PESU	CORA	UNKN
N	38	14	52	9	18	16	2	63	20	23	37	30	4	5
%	11.48	4.23	15.71	2.72	5.44	4.83	0.60	19.03	6.04	6.95	11.18	9.06	1.21	1.51
MLE (p)	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.999999	0.000001	0.010473	0.519133	0.000001	0.000001	0.046525	

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ID	EPFU	LANO	LABO	LACI	MYAU	MYGR	MYLE	MYLU	MYSE	MYSO	NYHU	PESU	CORA	UNKN
N	34	11	56	12	26	11	1	78	23	61	35	31	2	4
%	8.83	2.86	14.55	3.12	6.75	2.86	0.26	20.26	5.97	15.84	9.09	8.05	0.52	1.04
MLE (p)	0.000001	0.000001	0.000001	0.000001	0.000001	0.001521	0.999999	0.000001	0.039454	0.000017	0.000001	0.000001	0.800258	

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ID	EPFU	LANO	LABO	LACI	MYAU	MYGR	MYLE	MYLU	MYSE	MYSO	NYHU	PESU	CORA	UNKN
N	34	11	56	12	26	12	1	76	3	59	35	30	2	4
%	9.42	3.05	15.51	3.32	7.20	3.32	0.28	21.05	0.83	16.34	9.70	8.31	0.55	1.11
MLE (p)	0.000001	0.000001	0.000001	0.000001	0.000001	0.000141	0.999999	0.000001	0.999999	0.000001	0.000001	0.000001	0.713464	

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ID	EPFU	LANO	LABO	LACI	MYAU	MYGR	MYLE	MYLU	MYSE	MYSO	NYHU	PESU	CORA	UNKN
N	34	11	56	12	25	12	1	71	23	23	35	30	2	4
%	10.03	3.24	16.52	3.54	7.37	3.54	0.29	20.94	6.78	6.78	10.32	8.85	0.59	1.18
MLE (p)	0.000001	0.000001	0.000001	0.000001	0.000001	0.000214	0.999999	0.000001	0.016738	0.999999	0.000001	0.000001	0.727787	

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ID	EPFU	LANO	LABO	LACI	MYAU	MYGR	MYLU	MYSE	MYSO	NYHU	PESU	CORA	UNKN
N	40	5	60	13	15	18	58	23	65	41	28	1	5
%	10.75	1.34	16.13	3.49	4.03	4.84	15.59	6.18	17.47	11.02	7.53	0.27	1.34
MLE (p)	0.000001	0.002813	0.000001	0.000001	0.000001	0.000001	0.000001	0.000200	0.000001	0.000001	0.000001	0.955775	

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ID	EPFU	LANO	LABO	LACI	MYAU	MYGR	MYLU	MYSE	MYSO	NYHU	PESU	CORA	UNKN
N	40	5	60	13	15	17	56	4	60	41	28	1	6
%	11.56	1.45	17.34	3.76	4.34	4.91	16.18	1.16	17.34	11.85	8.09	0.29	1.73
MLE (p)	0.000001	0.002902	0.000001	0.000001	0.000001	0.000001	0.000001	0.999999	0.000001	0.000001	0.000001	0.958903	

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ID	EPFU	LANO	LABO	LACI	MYAU	MYGR	MYLU	MYSE	MYSO	NYHU	PESU	CORA	UNKN
N	40	5	60	13	14	17	56	23	27	41	27	1	6
%	12.12	1.52	18.18	3.94	4.24	5.15	16.97	6.97	8.18	12.42	8.18	0.30	1.82
MLE (p)	0.000001	0.002811	0.000001	0.000001	0.000001	0.000001	0.000001	0.000085	0.029243	0.000001	0.000001	0.902704	

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ID	EPFU	LANO	LABO	LACI	MYAU	MYGR	MYLE	MYLU	MYSE	MYSO	NYHU	PESU	CORA	UNKN
N	38	9	51	12	22	14	1	65	20	64	38	29	1	4
%	10.33	2.45	13.86	3.26	5.98	3.80	0.27	17.66	5.43	17.39	10.33	7.88	0.27	1.09
MLE (p)	0.000001	0.000001	0.000001	0.000001	0.000001	0.000006	0.999999	0.000001	0.042678	0.000001	0.000001	0.000001	0.999999	

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ID	EPFU	LANO	LABO	LACI	MYAU	MYGR	MYLE	MYLU	MYSE	MYSO	NYHU	PESU	CORA	UNKN
N	38	9	50	12	22	14	1	63	2	62	38	29	1	4
%	11.01	2.61	14.49	3.48	6.38	4.06	0.29	18.26	0.58	17.97	11.01	8.41	0.29	1.16
MLE (p)	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.999999	0.000001	0.999999	0.000001	0.000001	0.000001	0.999999	

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ID	EPFU	LANO	LABO	LACI	MYAU	MYGR	MYLE	MYLU	MYSE	MYSO	NYHU	PESU	CORA	UNKN
N	38	9	51	12	22	14	1	61	20	23	38	29	1	4
%	11.76	2.79	15.79	3.72	6.81	4.33	0.31	18.89	6.19	7.12	11.76	8.98	0.31	1.24
MLE (p)	0.000001	0.000001	0.000001	0.000001	0.000001	0.000005	0.999999	0.000001	0.038035	0.998714	0.000001	0.000001	0.999999	

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ID	EPFU	LANO	LABO	LACI	MYAU	MYGR	MYLE	MYLU	MYSE	MYSO	NYHU	PESU	UNKN
N	38	10	54	14	20	18	2	65	23	51	34	29	5
%	10.47	2.75	14.88	3.86	5.51	4.96	0.55	17.91	6.34	14.05	9.37	7.99	1.38
MLE (p)	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.999999	0.000001	0.003458	0.000023	0.000001	0.000001	

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ID	EPFU	LANO	LABO	LACI	MYAU	MYGR	MYLE	MYLU	MYSE	MYSO	NYHU	PESU	UNKN
N	38	10	54	14	20	18	1	64	3	47	34	29	5
%	11.28	2.97	16.02	4.15	5.93	5.34	0.30	18.99	0.89	13.95	10.09	8.61	1.48
MLE (p)	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.999999	0.000001	0.999999	0.000007	0.000001	0.000001	

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ID	EPFU	LANO	LABO	LACI	MYAU	MYGR	MYLE	MYLU	MYSE	MYSO	NYHU	PESU	UNKN
N	38	10	54	14	20	18	2	60	23	21	34	29	5
%	11.59	3.05	16.46	4.27	6.10	5.49	0.61	18.29	7.01	6.40	10.37	8.84	1.52
MLE (p)	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.999999	0.000001	0.002735	0.998770	0.000001	0.000001	

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ID	EPFU	LANO	LABO	LACI	MYAU	MYGR	MYLE	MYLU	MYSE	MYSO	NYHU	PESU	CORA	UNKN
N	35	8	50	12	18	11	1	67	26	76	37	29	3	3
%	9.31	2.13	13.30	3.19	4.79	2.93	0.27	17.82	6.91	20.21	9.84	7.71	0.80	0.80
MLE (p)	0.000001	0.000003	0.000001	0.000001	0.000001	0.000101	0.999999	0.000001	0.000178	0.000001	0.000001	0.000001	0.155426	

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ID	EPFU	LANO	LABO	LACI	MYAU	MYGR	MYLE	MYLU	MYSE	MYSO	NYHU	PESU	CORA	UNKN
N	35	8	50	12	17	11	1	65	5	72	37	29	3	3
%	10.06	2.30	14.37	3.45	4.89	3.16	0.29	18.68	1.44	20.69	10.63	8.33	0.86	0.86
MLE (p)	0.000001	0.000003	0.000001	0.000001	0.000001	0.000035	0.999999	0.000001	0.999999	0.000001	0.000001	0.000001	0.115720	

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ID	EPFU	LANO	LABO	LACI	MYAU	MYGR	MYLE	MYLU	MYSE	MYSO	NYHU	PESU	CORA	UNKN
N	35	8	50	12	17	11	1	63	26	29	37	29	3	3
%	10.80	2.47	15.43	3.70	5.25	3.40	0.31	19.44	8.02	8.95	11.42	8.95	0.93	0.93
MLE (p)	0.000001	0.000003	0.000001	0.000001	0.000001	0.000067	0.999999	0.000001	0.000082	0.068594	0.000001	0.000001	0.139500	

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ID	EPFU	LANO	LABO	LACI	MYAU	MYGR	MYLE	MYLU	MYSE	MYSO	NYHU	PESU	CORA	UNKN
N	31	10	48	14	22	9	1	73	18	65	38	25	2	3
%	8.64	2.79	13.37	3.90	6.13	2.51	0.28	20.33	5.01	18.11	10.58	6.96	0.56	0.84
MLE (p)	0.000001	0.000001	0.000001	0.000001	0.000001	0.005179	0.999999	0.000001	0.113590	0.000001	0.000001	0.000001	0.639738	

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ID	EPFU	LANO	LABO	LACI	MYAU	MYGR	MYLE	MYLU	MYSE	MYSO	NYHU	PESU	CORA	UNKN
N	31	10	49	14	22	9	1	72	2	59	37	25	2	3
%	9.23	2.98	14.58	4.17	6.55	2.68	0.30	21.43	0.60	17.56	11.01	7.44	0.60	0.89
MLE (p)	0.000001	0.000001	0.000001	0.000001	0.000001	0.002082	0.999999	0.000001	0.999999	0.000001	0.000001	0.000001	0.542608	

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ID	EPFU	LANO	LABO	LACI	MYAU	MYGR	MYLE	MYLU	MYSE	MYSO	NYHU	PESU	CORA	UNKN
N	31	10	47	14	22	9	1	65	18	25	38	25	2	3
%	10.00	3.23	15.16	4.52	7.10	2.90	0.32	20.97	5.81	8.06	12.26	8.06	0.65	0.97
MLE (p)	0.000001	0.000001	0.000001	0.000001	0.000001	0.005182	0.999999	0.000001	0.112282	0.735513	0.000001	0.000001	0.647014	

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ID	EPFU	LANO	LABO	LACI	MYAU	MYGR	MYLE	MYLU	MYSE	MYSO	NYHU	PESU	CORA	UNKN
N	43	7	47	15	25	13	2	72	20	61	48	28	3	5
%	11.05	1.80	12.08	3.86	6.43	3.34	0.51	18.51	5.14	15.68	12.34	7.20	0.77	1.29
MLE (p)	0.000001	0.000094	0.000001	0.000001	0.000001	0.000111	0.999999	0.000001	0.119093	0.000010	0.000001	0.000001	0.338407	

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ID	EPFU	LANO	LABO	LACI	MYAU	MYGR	MYLE	MYLU	MYSE	MYSO	NYHU	PESU	CORA	UNKN
N	43	7	47	15	25	13	1	69	3	58	48	28	3	5
%	11.78	1.92	12.88	4.11	6.85	3.56	0.27	18.90	0.82	15.89	13.15	7.67	0.82	1.37
MLE (p)	0.000001	0.000095	0.000001	0.000001	0.000001	0.000027	0.999999	0.000001	0.999999	0.000001	0.000001	0.000001	0.252926	

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ID	EPFU	LANO	LABO	LACI	MYAU	MYGR	MYLE	MYLU	MYSE	MYSO	NYHU	PESU	CORA	UNKN
N	43	7	47	15	25	13	2	66	20	17	48	28	3	5
%	12.68	2.06	13.86	4.42	7.37	3.83	0.59	19.47	5.90	5.01	14.16	8.26	0.88	1.47
MLE (p)	0.000001	0.000094	0.000001	0.000001	0.000001	0.000034	0.999999	0.000001	0.047490	0.999999	0.000001	0.000001	0.268379	

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ID	EPFU	LANO	LABO	LACI	MYAU	MYGR	MYLE	MYLU	MYSE	MYSO	NYHU	PESU	CORA	UNKN
N	42	9	53	7	25	11	1	63	17	61	40	28	2	8
%	11.44	2.45	14.44	1.91	6.81	3.00	0.27	17.17	4.63	16.62	10.90	7.63	0.54	2.18
MLE (p)	0.000001	0.000001	0.000001	0.000001	0.000001	0.001146	0.999999	0.000001	0.335439	0.000006	0.000001	0.000001	0.762417	

c:/users/cnrcommonaccess/documents/usgs software testing/call library/software test sets/software test sets 2019-03-15 just zc for bcid\test 8\no MYSE\

ID	EPFU	LANO	LABO	LACI	MYAU	MYGR	MYLE	MYLU	MYSE	MYSO	NYHU	PESU	CORA	UNKN
N	42	9	52	7	25	11	61	3	3	58	41	28	2	8
%	12.10	2.59	14.99	2.02	7.20	3.17	17.58	0.86	0.86	16.71	11.82	8.07	0.58	2.31
MLE (p)	0.000001	0.000001	0.000001	0.000001	0.000001	0.000360	0.000001	0.999999	0.999999	0.000001	0.000001	0.000001	0.663473	

c:/users/cnrcommonaccess/documents/usgs software testing/call library/software test sets/software test sets 2019-03-15 just zc for bcid\test 8\no MYSO\

ID	EPFU	LANO	LABO	LACI	MYAU	MYGR	MYLE	MYLU	MYSE	MYSO	NYHU	PESU	CORA	UNKN
N	42	9	52	7	25	11	1	59	17	19	41	28	2	8
%	13.08	2.80	16.20	2.18	7.79	3.43	0.31	18.38	5.30	5.92	12.77	8.72	0.62	2.49
MLE (p)	0.000001	0.000001	0.000001	0.000001	0.000001	0.000539	0.999999	0.000001	0.208656	0.999999	0.000001	0.000001	0.698715	

c:/users/cnrcommonaccess/documents/usgs software testing/call library/software test sets/software test sets 2019-03-15 just zc for bcid\test 9\all\

ID	EPFU	LANO	LABO	LACI	MYAU	MYGR	MYLE	MYLU	MYSE	MYSO	NYHU	PESU	CORA	UNKN
N	39	11	54	10	18	15	1	69	26	63	42	28	2	6
%	10.16	2.86	14.06	2.60	4.69	3.91	0.26	17.97	6.77	16.41	10.94	7.29	0.52	1.56
MLE (p)	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.999999	0.000001	0.000181	0.000001	0.000001	0.000001	0.473680	

c:/users/cnrcommonaccess/documents/usgs software testing/call library/software test sets/software test sets 2019-03-15 just zc for bcid\test 9\no MYSE\

ID	EPFU	LANO	LABO	LACI	MYAU	MYGR	MYLE	MYLU	MYSE	MYSO	NYHU	PESU	CORA	UNKN
N	39	11	54	10	19	15	1	66	4	61	42	28	2	6
%	10.89	3.07	15.08	2.79	5.31	4.19	0.28	18.44	1.12	17.04	11.73	7.82	0.56	1.68
MLE (p)	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.999999	0.000001	0.999999	0.000001	0.000001	0.000001	0.451341	

c:/users/cnrcommonaccess/documents/usgs software testing/call library/software test sets/software test sets 2019-03-15 just zc for bcid\test 9\no MYSO\

ID	EPFU	LANO	LABO	LACI	MYAU	MYGR	MYLE	MYLU	MYSE	MYSO	NYHU	PESU	CORA	UNKN
N	39	11	54	10	17	15	1	63	26	22	42	28	2	6
%	11.61	3.27	16.07	2.98	5.06	4.46	0.30	18.75	7.74	6.55	12.50	8.33	0.60	1.79
MLE (p)	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.999999	0.000001	0.000074	0.494945	0.000001	0.000001	0.440911	

Table 2. BCID 2.8 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	Producer's		Common	User's		Common
0.0	Accuracy	SD	Mis-ID	Accuracy	SD	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/MYAU

Table 3. BCID 2.8 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.

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ID	EPFU	LANO	LABO	LACI	MYAU	MYGR	MYLU	MYSE	MYSO	NYHU	PESU	CORA	UNKN
N	22	7	8	4	14	6	28	13	41	26	22	4	180
%	5.87	1.87	2.13	1.07	3.73	1.60	7.47	3.47	10.93	6.93	5.87	1.07	48.00
MLE (p)	0.000001	0.000001	0.019532	0.000002	0.000001	0.019670	0.000001	0.087693	0.000013	0.000001	0.000001	0.018048	

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

ID	EPFU	LANO	LABO	LACI	MYAU	MYGR	MYLE	MYLU	MYSE	MYSO	NYHU	PESU	CORA	UNKN
N	22	7	8	4	14	7	1	26	38	26	22	4	172	
%	6.27	1.99	2.28	1.14	3.99	1.99	0.28	7.41	10.83	7.41	6.27	1.14	49.00	
MLE (p)	0.000001	0.000001	0.013235	0.000002	0.000001	0.002523	0.999999	0.000001	0.000003	0.000001	0.000001	0.010776		

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

ID	EPFU	LANO	LABO	LACI	MYAU	MYGR	MYLE	MYLU	MYSE	MYSO	NYHU	PESU	CORA	UNKN
N	22	7	8	4	14	6	1	27	13	10	26	22	4	167
%	6.65	2.11	2.42	1.21	4.23	1.81	0.30	8.16	3.93	3.02	7.85	6.65	1.21	50.45
MLE (p)	0.000001	0.000001	0.013857	0.000002	0.000001	0.013824	0.999999	0.000001	0.049802	0.999999	0.000001	0.000001	0.013685	

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

ID	EPFU	LANO	LABO	LACI	MYAU	MYGR	MYLE	MYLU	MYSE	MYSO	NYHU	PESU	CORA	UNKN
N	14	7	10	10	18	4	1	31	17	38	24	23	2	186
%	3.64	1.82	2.60	2.60	4.68	1.04	0.26	8.05	4.42	9.87	6.23	5.97	0.52	48.31
MLE (p)	0.000001	0.000001	0.002536	0.000001	0.000001	0.335044	0.999999	0.000001	0.051222	0.001854	0.000001	0.000001	0.482375	

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

ID	EPFU	LANO	LABO	LACI	MYAU	MYGR	MYLE	MYLU	MYSE	MYSO	NYHU	PESU	CORA	UNKN
N	14	7	10	10	18	5	1	30	1	36	24	22	2	181
%	3.88	1.94	2.77	2.77	4.99	1.39	0.28	8.31	0.28	9.97	6.65	6.09	0.55	50.14
MLE (p)	0.000001	0.000001	0.001278	0.000001	0.000001	0.087580	0.999999	0.000001	0.999999	0.000341	0.000001	0.000001	0.389820	

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

ID	EPFU	LANO	LABO	LACI	MYAU	MYGR	MYLE	MYLU	MYSE	MYSO	NYHU	PESU	CORA	UNKN
N	14	7	10	10	17	5	1	29	17	10	24	22	2	171
%	4.13	2.06	2.95	2.95	5.01	1.47	0.29	8.55	5.01	2.95	7.08	6.49	0.59	50.44
MLE (p)	0.000001	0.000001	0.001234	0.000001	0.000001	0.074477	0.999999	0.000001	0.010254	0.999999	0.000001	0.000001	0.360191	

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

ID	EPFU	LANO	LABO	LACI	MYAU	MYGR	MYLU	MYSE	MYSO	NYHU	PESU	CORA	UNKN
N	20	4	13	11	11	12	24	17	42	30	23	1	164
%	5.38	1.08	3.49	2.96	2.96	3.23	6.45	4.57	11.29	8.06	6.18	0.27	44.09
MLE (p)	0.000001	0.002041	0.000085	0.000001	0.000001	0.000001	0.000001	0.001293	0.000001	0.000001	0.000001	0.724741	

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

ID	EPFU	LANO	LABO	LACI	MYAU	MYGR	MYLU	MYSO	NYHU	PESU	CORA	UNKN
N	20	4	13	11	10	11	23	38	30	23	1	162
%	5.78	1.16	3.76	3.18	2.89	3.18	6.65	10.98	8.67	6.65	0.29	46.82
MLE (p)	0.000001	0.002113	0.000032	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.584407	

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

ID	EPFU	LANO	LABO	LACI	MYAU	MYGR	MYLU	MYSE	MYSO	NYHU	PESU	CORA	UNKN
N	20	4	13	11	11	11	23	17	10	30	23	1	156
%	6.06	1.21	3.94	3.33	3.33	3.33	6.97	5.15	3.03	9.09	6.97	0.30	47.27
MLE (p)	0.000001	0.002042	0.000052	0.000001	0.000001	0.000001	0.000001	0.000621	0.999999	0.000001	0.000001	0.704523	

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

ID	EPFU	LANO	LABO	LACI	MYAU	MYGR	MYLU	MYSE	MYSO	NYHU	PESU	CORA	UNKN
N	21	6	7	9	18	9	23	16	41	32	22	1	163
%	5.71	1.63	1.90	2.45	4.89	2.45	6.25	4.35	11.14	8.70	5.98	0.27	44.29
MLE (p)	0.000001	0.000019	0.127307	0.000001	0.000001	0.001290	0.000001	0.075442	0.000293	0.000001	0.000001	0.999999	

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

ID	EPFU	LANO	LABO	LACI	MYAU	MYGR	MYLU	MYSO	NYHU	PESU	CORA	UNKN
N	21	6	7	9	18	9	22	38	32	22	1	160
%	6.09	1.74	2.03	2.61	5.22	2.61	6.38	11.01	9.28	6.38	0.29	46.38
MLE (p)	0.000001	0.000020	0.089100	0.000001	0.000001	0.000397	0.000001	0.000052	0.000001	0.000001	0.997149	

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

ID	EPFU	LANO	LABO	LACI	MYAU	MYGR	MYLU	MYSE	MYSO	NYHU	PESU	CORA	UNKN
N	21	6	7	9	18	9	23	16	11	32	22	1	148
%	6.50	1.86	2.17	2.79	5.57	2.79	7.12	4.95	3.41	9.91	6.81	0.31	45.82
MLE (p)	0.000001	0.000019	0.093833	0.000001	0.000001	0.000500	0.000001	0.028155	0.999999	0.000001	0.000001	0.998192	

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

ID	EPFU	LANO	LABO	LACI	MYAU	MYGR	MYLE	MYLU	MYSE	MYSO	NYHU	PESU	UNKN
N	21	5	9	10	15	11	1	30	17	33	26	22	163
%	5.79	1.38	2.48	2.75	4.13	3.03	0.28	8.26	4.68	9.09	7.16	6.06	44.90
MLE (p)	0.000001	0.000230	0.008375	0.000001	0.000001	0.000019	0.999999	0.000001	0.012226	0.002117	0.000001	0.000001	

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

ID	EPFU	LANO	LABO	LACI	MYAU	MYGR	MYLU	MYSE	MYSO	NYHU	PESU	UNKN
N	21	5	9	10	15	11	29	1	31	26	22	157
%	6.23	1.48	2.67	2.97	4.45	3.26	8.61	0.30	9.20	7.72	6.53	46.59
MLE (p)	0.000001	0.000237	0.004595	0.000001	0.000001	0.000004	0.000001	0.999999	0.000454	0.000001	0.000001	

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

ID	EPFU	LANO	LABO	LACI	MYAU	MYGR	MYLE	MYLU	MYSE	MYSO	NYHU	PESU	UNKN
N	21	5	9	10	15	11	1	28	17	7	26	22	156
%	6.40	1.52	2.74	3.05	4.57	3.35	0.30	8.54	5.18	2.13	7.93	6.71	47.56
MLE (p)	0.000001	0.000230	0.004896	0.000001	0.000001	0.000004	0.999999	0.000001	0.002241	0.999999	0.000001	0.000001	

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

ID	EPFU	LANO	LABO	LACI	MYAU	MYGR	MYLU	MYSE	MYSO	NYHU	PESU	CORA	UNKN
N	22	6	11	10	15	5	28	20	48	32	22	3	154
%	5.85	1.60	2.93	2.66	3.99	1.33	7.45	5.32	12.77	8.51	5.85	0.80	40.96
MLE (p)	0.000001	0.000025	0.002013	0.000001	0.000001	0.075719	0.000001	0.001734	0.000001	0.000001	0.000001	0.098061	

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

ID	EPFU	LANO	LABO	LACI	MYAU	MYGR	MYLU	MYSE	MYSO	NYHU	PESU	CORA	UNKN
N	22	6	11	10	14	5	28	2	45	32	22	3	148
%	6.32	1.72	3.16	2.87	4.02	1.44	8.05	0.57	12.93	9.20	6.32	0.86	42.53
MLE (p)	0.000001	0.000026	0.000973	0.000001	0.000001	0.039382	0.000001	0.999999	0.000001	0.000001	0.000001	0.061130	

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

ID	EPFU	LANO	LABO	LACI	MYAU	MYGR	MYLU	MYSE	MYSO	NYHU	PESU	CORA	UNKN
N	22	6	11	10	14	5	26	20	10	32	22	3	143
%	6.79	1.85	3.40	3.09	4.32	1.54	8.02	6.17	3.09	9.88	6.79	0.93	44.14
MLE (p)	0.000001	0.000025	0.001064	0.000001	0.000001	0.041572	0.000001	0.000219	0.999999	0.000001	0.000001	0.063739	

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

ID	EPFU	LANO	LABO	LACI	MYAU	MYGR	MYLU	MYSE	MYSO	NYHU	PESU	CORA	UNKN
N	13	6	6	11	16	5	32	14	43	29	20	2	162
%	3.62	1.67	1.67	3.06	4.46	1.39	8.91	3.90	11.98	8.08	5.57	0.56	45.13
MLE (p)	0.000001	0.000004	0.181874	0.000001	0.000001	0.091825	0.000001	0.107038	0.000027	0.000001	0.000001	0.390467	

c:/users/cnrcommonaccess/documents/usgs software testing/call library/software test sets/software test sets 2019-03-15 just zc for bcid\test 6\no MYSE

ID	EPFU	LANO	LABO	LACI	MYAU	MYGR	MYLU	MYSE	MYSO	NYHU	PESU	CORA	UNKN
N	13	6	6	11	16	5	31	1	38	28	20	2	159
%	3.87	1.79	1.79	3.27	4.76	1.49	9.23	0.30	11.31	8.33	5.95	0.60	47.32
MLE (p)	0.000001	0.000004	0.126062	0.000001	0.000001	0.055321	0.000001	0.999999	0.000021	0.000001	0.000001	0.312729	

c:/users/cnrcommonaccess/documents/usgs software testing/call library/software test sets/software test sets 2019-03-15 just zc for bcid\test 6\no MYSO

ID	EPFU	LANO	LABO	LACI	MYAU	MYGR	MYLU	MYSE	MYSO	NYHU	PESU	CORA	UNKN
N	13	6	6	11	16	5	30	14	11	29	20	2	147
%	4.19	1.94	1.94	3.55	5.16	1.61	9.68	4.52	3.55	9.35	6.45	0.65	47.42
MLE (p)	0.000001	0.000004	0.140203	0.000001	0.000001	0.062782	0.000001	0.051228	0.999999	0.000001	0.000001	0.331467	

c:/users/cnrcommonaccess/documents/usgs software testing/call library/software test sets/software test sets 2019-03-15 just zc for bcid\test 7\all

ID	EPFU	LANO	LABO	LACI	MYAU	MYGR	MYLE	MYLU	MYSE	MYSO	NYHU	PESU	CORA	UNKN
N	21	4	10	13	16	8	1	31	13	44	36	20	3	169
%	5.40	1.03	2.57	3.34	4.11	2.06	0.26	7.97	3.34	11.31	9.25	5.14	0.77	43.44
MLE (p)	0.000001	0.002753	0.009626	0.000001	0.000001	0.003088	0.999999	0.000001	0.187705	0.000020	0.000001	0.000001	0.121972	

c:/users/cnrcommonaccess/documents/usgs software testing/call library/software test sets/software test sets 2019-03-15 just zc for bcid\test 7\no MYSE

ID	EPFU	LANO	LABO	LACI	MYAU	MYGR	MYLU	MYSO	NYHU	PESU	CORA	UNKN
N	21	4	10	13	16	8	30	41	36	20	3	163
%	5.75	1.10	2.74	3.56	4.38	2.19	8.22	11.23	9.86	5.48	0.82	44.66
MLE (p)	0.000001	0.002792	0.005783	0.000001	0.000001	0.000986	0.000001	0.000002	0.000001	0.000001	0.076747	

c:/users/cnrcommonaccess/documents/usgs software testing/call library/software test sets/software test sets 2019-03-15 just zc for bcid\test 7\no MYSO

ID	EPFU	LANO	LABO	LACI	MYAU	MYGR	MYLE	MYLU	MYSE	MYSO	NYHU	PESU	CORA	UNKN
N	21	4	10	13	16	8	1	30	13	9	36	20	3	155
%	6.19	1.18	2.95	3.83	4.72	2.36	0.29	8.85	3.83	2.65	10.62	5.90	0.88	45.72
MLE (p)	0.000001	0.002754	0.005783	0.000001	0.000001	0.001232	0.999999	0.000001	0.082464	0.999999	0.000001	0.000001	0.085055	

c:/users/cnrcommonaccess/documents/usgs software testing/call library/software test sets/software test sets 2019-03-15 just zc for bcid\test 8\all

ID	EPFU	LANO	LABO	LACI	MYAU	MYGR	MYLE	MYLU	MYSE	MYSO	NYHU	PESU	CORA	UNKN
N	22	6	11	5	20	4	1	25	12	38	30	24	2	167
%	5.99	1.63	3.00	1.36	5.45	1.09	0.27	6.81	3.27	10.35	8.17	6.54	0.54	45.50
MLE (p)	0.000001	0.000015	0.002144	0.000001	0.000001	0.429140	0.999999	0.000001	0.654307	0.004663	0.000001	0.000001	0.565443	

c:/users/cnrcommonaccess/documents/usgs software testing/call library/software test sets/software test sets 2019-03-15 just zc for bcid\test 8\no MYSE

ID	EPFU	LANO	LABO	LACI	MYAU	MYGR	MYLU	MYSO	NYHU	PESU	CORA	UNKN
N	22	6	11	5	20	4	24	35	31	24	2	163
%	6.34	1.73	3.17	1.44	5.76	1.15	6.92	10.09	8.93	6.92	0.58	46.97
MLE (p)	0.000001	0.000015	0.001289	0.000001	0.000001	0.290519	0.000001	0.001159	0.000001	0.000001	0.443907	

c:/users/cnrcommonaccess/documents/usgs software testing/call library/software test sets/software test sets 2019-03-15 just zc for bcid\test 8\no MYSO

ID	EPFU	LANO	LABO	LACI	MYAU	MYGR	MYLE	MYLU	MYSE	MYSO	NYHU	PESU	CORA	UNKN
N	22	6	11	5	20	4	1	25	12	7	31	24	2	151
%	6.85	1.87	3.43	1.56	6.23	1.25	0.31	7.79	3.74	2.18	9.66	7.48	0.62	47.04
MLE (p)	0.000001	0.000015	0.001075	0.000001	0.000001	0.276717	0.999999	0.000001	0.377720	0.999999	0.000001	0.000001	0.431104	

c:/users/cnrcommonaccess/documents/usgs software testing/call library/software test sets/software test sets 2019-03-15 just zc for bcid\test 9\all

ID	EPFU	LANO	LABO	LACI	MYAU	MYGR	MYLU	MYSE	MYSO	NYHU	PESU	CORA	UNKN
N	21	8	10	6	12	7	27	20	39	34	22	2	176
%	5.47	2.08	2.60	1.56	3.13	1.82	7.03	5.21	10.16	8.85	5.73	0.52	45.83
MLE (p)	0.000001	0.000001	0.005916	0.000001	0.000001	0.002244	0.000001	0.000237	0.000008	0.000001	0.000001	0.240243	

c:/users/cnrcommonaccess/documents/usgs software testing/call library/software test sets/software test sets 2019-03-15 just zc for bcid\test 9\no MYSE

ID	EPFU	LANO	LABO	LACI	MYAU	MYGR	MYLU	MYSE	MYSO	NYHU	PESU	CORA	UNKN
N	21	8	10	6	13	7	25	1	38	34	22	2	171
%	5.87	2.23	2.79	1.68	3.63	1.96	6.98	0.28	10.61	9.50	6.15	0.56	47.77
MLE (p)	0.000001	0.000001	0.003728	0.000001	0.000001	0.001542	0.000001	0.999999	0.000001	0.000001	0.000001	0.219706	

c:/users/cnrcommonaccess/documents/usgs software testing/call library/software test sets/software test sets 2019-03-15 just zc for bcid\test 9\no MYSO

ID	EPFU	LANO	LABO	LACI	MYAU	MYGR	MYLU	MYSE	MYSO	NYHU	PESU	CORA	UNKN
N	21	8	10	6	11	7	26	20	7	34	22	2	162
%	6.25	2.38	2.98	1.79	3.27	2.08	7.74	5.95	2.08	10.12	6.55	0.60	48.21
MLE (p)	0.000001	0.000001	0.003502	0.000001	0.000001	0.000666	0.000001	0.000014	0.999999	0.000001	0.000001	0.165158	

Table 4. BCID 2.8 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