

**HABITAT ASSESSMENT REPORT FOR THE INDIANA
BAT (MYOTIS SODALIS), EAST GROWTH AREA: WATER
AND SANITARY SEWER EXTENSION PROJECT, NORTH
LIBERTY, JOHNSON COUNTY, IOWA**

GES Project 14-527

November 14, 2014



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TABLE OF CONTENTS

EXECUTIVE SUMMARY 3

1.0 INTRODUCTION 3

 1.1 Purpose of the Project 4

 1.2 PROJECT DESCRIPTION 4

2.0 METHODS 5

3.0 CONCLUSIONS..... 5

4.0 METHODS 5

5.0 RECOMMENDATIONS..... 5

BACK MATTER

FIGURE 1 – RANGE OF POTENTIAL INDIANA BAT HABITAT IN IOWA

FIGURE 2 – GENERAL LOCATION MAP

FIGURE 3 – POTENTIAL INDIANA BAT HABITAT AND ROOSTING TREES

APPENDIX A – BAT TREE SURVEY DATASHEETS

APPENDIX B – INDIANA BAT HABITAT ASSESSMENT DATA FORM

**HABITAT ASSESSMENT REPORT FOR THE INDIANA BAT (*MYOTIS SODALIS*),
EAST GROWTH AREA: WATER AND SANITARY SEWER EXTENSION PROJECT,
NORTH LIBERTY, JOHNSON COUNTY, IOWA**

GES PROJECT No. 14-527

NOVEMBER 14, 2014

EXECUTIVE SUMMARY

GRIGGS ENVIRONMENTAL STRATEGIES, INC. completed a habitat assessment to determine the presence of potentially suitable summer-maternity roosts for the Indiana bat (*Myotis sodalis*) for the above-referenced project. A total of 367 trees were inventoried along approximately 7,500 feet of underground piping alignment within the forested portion of the project area immediately north of Muddy Creek. The assessment identified 107 (n = 107) potential roost trees that could potentially be impacted by the project. Based on the results of this study, the North Liberty utility extension project may have moderate negative effects on potential Indiana bat habitat.

1.0 INTRODUCTION

Griggs Environmental Strategies, Inc. (GES) completed a field survey to assess habitat suitability for the Indiana bat (*Myotis sodalis*) for the proposed construction of underground piping in eastern North Liberty, Iowa. The principal objectives of this investigation were to: (1) characterize and define areas having suitable Indiana bat habitat within the project; (2) identify individual roosting trees that may be impacted by the proposed development; and (3) determine the need for additional biological surveys to produce information used in developing possible mitigation measures. Bill Martin completed the field survey on October 20 and 21, 2014 under suitable field conditions. This study is one of several environmental reviews being conducted for this proposed project.

The Indiana bat (*Myotis sodalis*) is a small, endangered bat that occurs in forested areas along streams in southern and central Iowa and states to the south and east. The Indiana bat and its habitat are protected by federal law under the *Endangered Species Act*. Construction projects – such as this one proposed by the City of North Liberty – are required to determine potential effects on endangered species as part of Section 7 Information Consultation process to assist the lead federal agency in its review under the *National Environmental Policy Act*. Indiana bats can be impacted by tree clearing activities as well as disruption of its habitat during the summer maternity season.

Indiana bats frequent forested areas associated with small streams. The stream corridors are used as travel lanes for insect foraging. Groups of female Indiana bats will use large, mature and/or

dead or dying trees with loose or sloughing bark as summer maternity roosts. Indiana bats in Iowa migrate south to Missouri for winter hibernation. The proposed project area is located near the northern limits of the known Indiana bat range in Iowa (Figure 1).

The project area is located on a broad, rolling, northwest/south-east oriented interfluvial summit between Muddy Creek and the Iowa River (Coralville Reservoir). The topography is rolling to slightly rugged. The edge of the interfluvial below the project area is incised with deeply ephemeral and intermittent streams creating steep to slightly rugged topography. These streams – as well as Muddy Creek – drain immediately into the Iowa River (Coralville Reservoir). Outside these two stream corridors, the project crosses over a rolling, upland landscape containing single-family residences and agricultural fields.

The Muddy Creek and an unnamed perennial stream (a tributary of Muddy Creek) are both fairly open and unobstructed. Both stream channels include numerous pools, glides, riffles, and sandbars. Wooded areas include a well-developed, mature, uneven-aged canopy and overstory layers of native hardwoods and softwoods; a well-developed understory; a dense shrub layer of primarily invasive shrubs; and a dense ground layer of grasses, sedges, and forbs. The wooded corridor along Muddy Creek and the unnamed tributary could provide suitable roosting trees, and it provides open water for bats to maneuver while feeding.

1.1 Purpose of the Project

The City of North Liberty is currently planning to construct and install underground freshwater and sanitary piping connecting an existing water treatment facility in North Liberty to a proposed growth area on the east side of town. FOX Engineering Associates, Inc. is the civil engineering consultant for the project and will consider the results of this study in its planning and design efforts.

1.2 Project Description

The proposed utility improvements are located southwest, north and along North Liberty Road NE on the eastern edge of North Liberty, Iowa (Figure 2). The project is located in portions Sections 17, 18, 19, and 20, Township 80N, Range 8W (Penn Township), and it is depicted on the Ely (1994) and Iowa City West (1994) 7.5' series topographic maps. The Universal Transverse Mercator (UTM) coordinate for the center of the project study area is X = 618446, Y = 4621652 (UTM Zone 15, NAD83).

The project will include temporary ground disturbance by excavation; directional drilling; pipe and man-hole access construction; pump and/or lift station construction; final grading; stream bank protection; final seeding; and erosion control. No off-site borrows or disposal areas were identified for investigation. Construction of the project is expected to begin following the planning, design, approval, and funding of the project.

2.0 METHODS

The Indiana bat habitat assessment was conducted on October 20 and 21, 2014 by Bill Martin. A total of 367 trees were inventoried within an assumed corridor of 25 feet each side of the staked centerline. One property immediately north of Muddy Creek did not provide access to his property and this 1,100-foot stretch is not included in this analysis. The assessment included only potential forested habitat areas along the project alignment, where access permission was provided. Inventoried trees included all standing trees (living or dead) with diameter-at-breast height (dbh) of 8 inches or greater. The inventory included GPS coordinates; notation of species; living or dead status; estimated dbh; overall bark condition; and general habitat quality. A data summary is provided in Appendix A. The field protocols used during this study followed the recently issued guidance from the U.S. Fish and Wildlife Service for assessing Indiana Bat habitat. Habitat Assessment Datasheets are provided in Appendix B.

3.0 RESULTS

Of the 367 trees inventoried, 107 appeared to provide potentially suitable roost habitat in the form of loose bark and/or multiple cavities and include 14 standing dead trees (Figure 3). These trees may possibly be avoided by making minor alignment adjustments. All other trees inventoried appear to have intact bark or are non-bat preferred species.

4.0 CONCLUSIONS

A habitat assessment survey was undertaken to determine suitability for supporting a population of Indiana bats within the approximately 7,500 feet of forested corridor along Muddy Creek within the identified project area. Of the 367 trees inventoried, 107 appear to provide potentially suitable roost habitat.

The project, as designed, is not likely to negatively affect any Indiana bats or their habitats. Further surveys, including acoustic and/or mist netting are not likely to provide useful results.

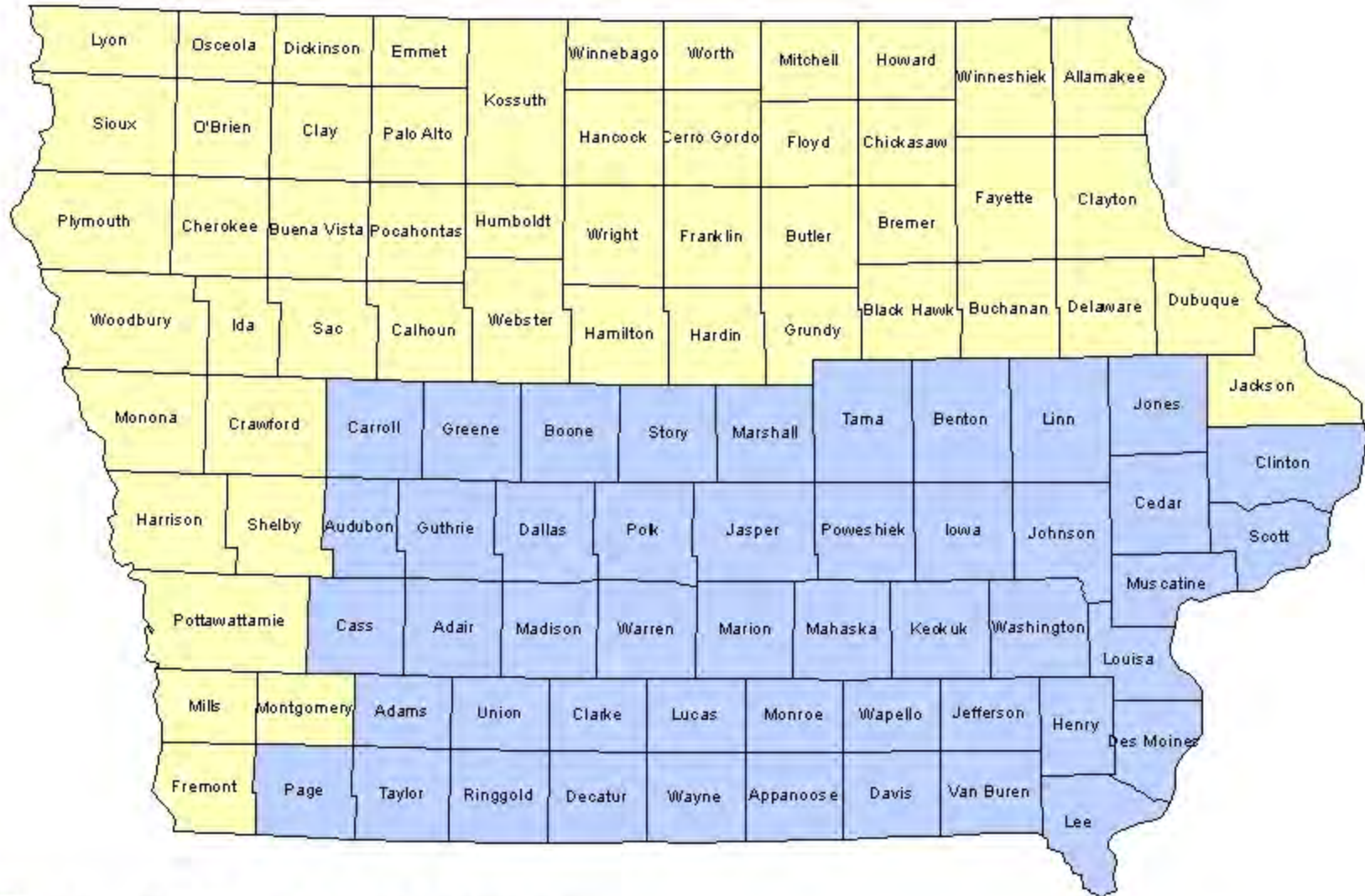
5.0 RECOMMENDATIONS


The following recommendations are provided to guide the final design of the project:

- If possible, adjust the proposed alignment where potential habitat trees are located so impacts to these trees can be avoided.
- All tree clearing activities should be conducted from October 15 to April 15 to avoid any roosting bats that may use the area.

FIGURES

Range of Potential Indiana Bat Habitat in Iowa



 Indiana Bat Potential Habitat Counties

Counties listed as of 5-26-11.
 Contact the U.S. Fish & Wildlife Service Rock Island Field Office
 at 309-757-5800 for additional Indiana bat information.

Figure 2. General Location Map.

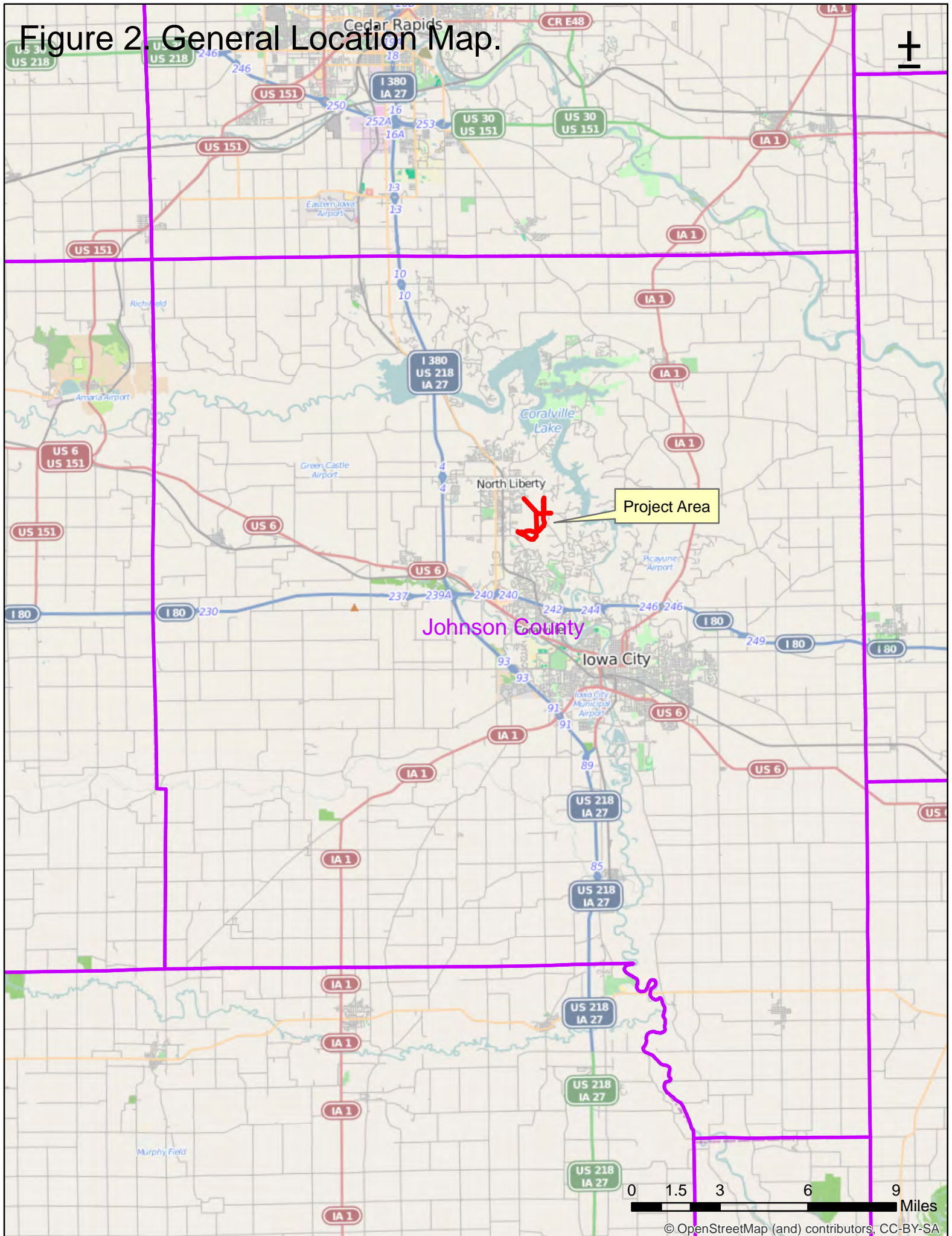
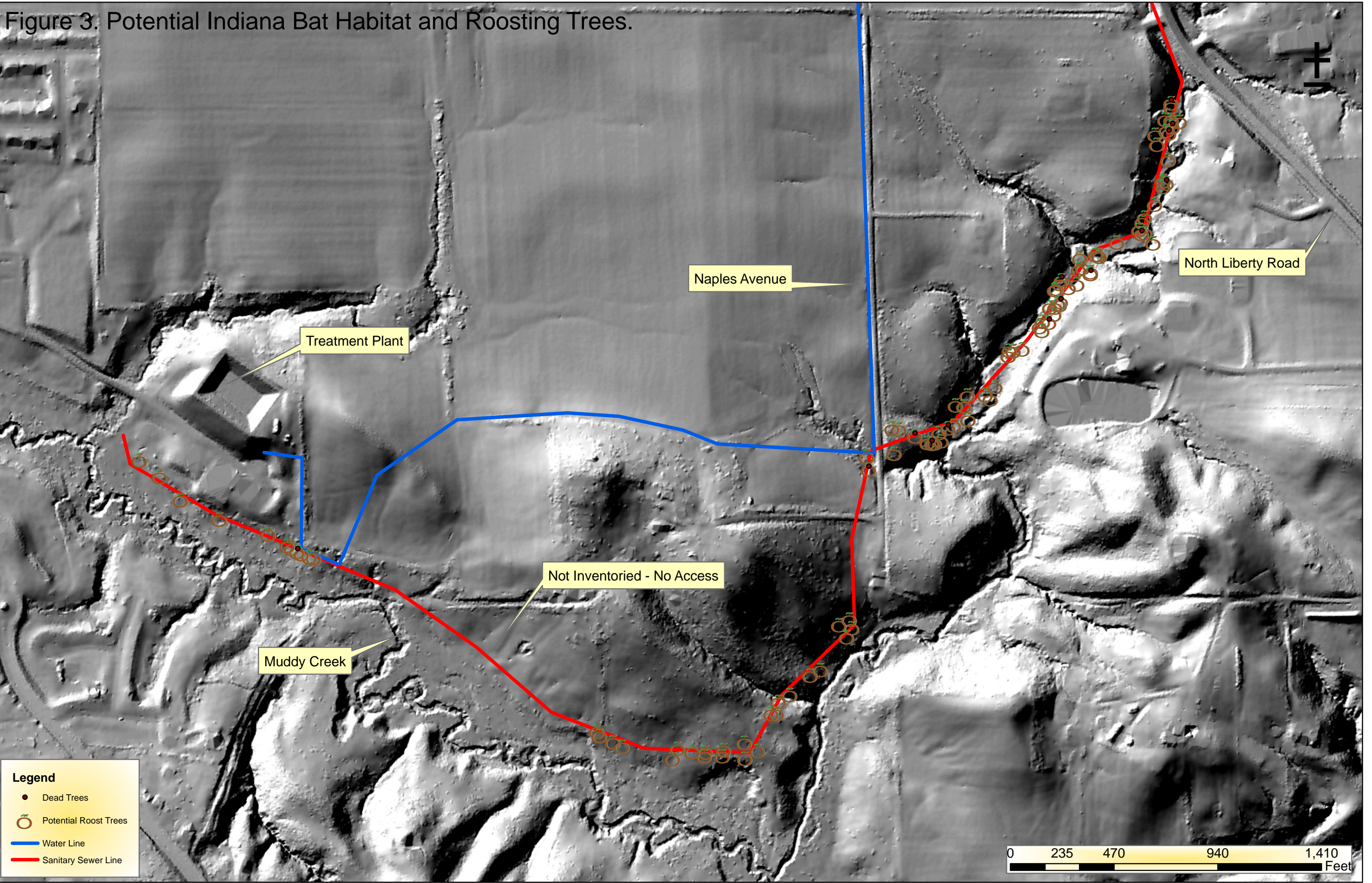


Figure 3. Potential Indiana Bat Habitat and Roosting Trees.



Legend

- Dead Trees
- Potential Roost Trees
- Water Line
- Sanitary Sewer Line



APPENDICES

APPENDIX A: BAT TREE SURVEY DATASHEETS

Tree

FID	Species	Status	Estimated_	Bark_Type	Bark_Intac	Quality	Comments
0	Unknown	Alive		12 Deep-Ridged-Interlaced	Yes	Low	
1	American elm	Alive		13 Deep-Ridged-Interlaced	Yes	Low	
2	Hackberry	Alive		14 ridged -	Yes	Low	
3	Hackberry	Alive		10 ridged	Yes	Low	
4	River birch	Alive		2 Exfoliating	No	High	
5	River birch	Alive		14 Platy	Yes	Low	
6	Cherry	Alive		9 Scaly	Yes	Low	
7	American elm	Alive		9 Ridged-shallow	Yes	Low	
8	Hackberry	Alive		9 Ridged	Yes	Low	
9	River birch	Alive		30 Platy	Yes	Low	
10	American elm	Alive		12 Ridged	Yes	Low	
11	River birch	Alive		15 Platy o	Yes	Low	
12	American elm	Alive		17 Ridged	Yes	Low	
13	River birch	Alive		12 Flakey	Yes	Low	
14	River birch	Dead		15 Platy	Yes	High	Snag
15	American elm	Alive		15 Deeply ridged	Yes	Low	
16	Cedar	Alive		13 Rigeded	Yes	Low	
17	River birch	Alive		18 Platy	Yes	Low	
18	River birch	Dead		16 Exfoliating	No	High	
19	River birch	Alive		12 Place	Yes	Low	
20	River birch	Alive		25 Platy	Yes	Low	
21	River birch	Alive		17 Platy	Yes	Low	
22	Unknown	Alive		14 Ridged-shallow	Yes	Low	
23	American elm	Alive		12 Ridged	Yes	Low	
24	Box elder	Alive		13 Ridged	Yes	Low	
25	River birch	Dead		12 Exfoliating	No	High	Snag

FID	Species	Status	Estimated_	Bark_Type	Bark_Intac	Quality	Comments
26	Cedar	Alive		17 Smooth	Yes	Low	
27	Red mulberry	Alive		19 Ridged-shallow p	Yes	Low	
28	Box elder	Alive		20 Ridged	Yes	Low	
29	American elm	Alive		14 Ridged	Yes	Low	
30	River birch	Alive		12 Platy	Yes	Low	
31	Box elder	Alive		14 Ridged	Yes	High	
32	River birch	Alive		10 Platy	Yes	Low	
33	Bur iak	Alive		25 Ridged	Yes	High	
34	Box elder	Alive		20 Ridged	Yes	Low	
35	River birch	Alive		11 Platy	Yes	Low	
36	American elm	Alive		17 Ridged	Yes	Low	
37	Box elder	Alive		16 Ridged	Yes	Low	
38	Basswood	Alive		0 Ridged	Yes	Low	
39	Pin oak	Alive		15 Small ridges	Yes	High	
40	Rivwr birch	Alive		25 Platy	Yes	Low	
41	Bur iak	Alive		37 Ridged	Yes	High	
42	Cottonwood	Alive		33 Deep ridgesp	Yes	High	
43	River birch	Alive		32 Platy	Yes	High	
44	Silver maple	Alive		15 Slight ridges	Yes	Low	
45	River birch	Alive		12 Platty	Yes	High	
46	River biech	Alive		13 Platy	Yes	Low	
47	River birch	Alive		12 Platy	Yes	Low	
48	River bir h	Alive		29 Platy	Yes	Low	
49	River birch	Alive		18 Platy	Yes	Low	
50	River birch	Alive		22 Platy	Yes	Low	
51	River birch	Dead		15 Exfoliating	No	High	Snag
52	Bur oak	Alive		40 Deeply ridged	Yes	High	
53	River birch	Alive		17 Platy	Yes	Low	
54	River birrch	Alive		22 Platy	Yes	Low	

FID	Species	Status	Estimated_	Bark_Type	Bark_Intac	Quality	Comments
55	Silver maple	Alive		14 Shallow ridges	Yes	Low	
56	River birch	Alive		16 Platy	Yes	Low	
57	River birch	Alive		15 Platy	Yes	Low	
58	Rivwr birch	Alive		19 Plary	Yes	Low	
59	River biexh	Alive		27 Platy	Yes	High	
60	Rivwe birch	Alive		17 Platy	Yes	Low	
61	Rover birch	Alive		14 Platy	Yes	Low	
62	River birch	Alive		32 Platy	Yes	Low	
63	Silver maple	Alive		15 Slight ridges	Yes	Low	
64	River birch	Alive		18 Platy	Yes	Low	
65	Rovwr boexh	Alive		22 Platy	Yes	Low	
66	Silvwr maple	Alive		29 Slight ridges	Yes	Low	
67	Eivwr birch	Alive		17 Platy	Yes	Low	
68	River birch	Alive		11 Platy	Yes	Low	
69	River birch	Alive		12 Platy	Yes	Low	
70	River birch	Alive		14 Platy	Yes	High	
71	River birch	Alive		14 Platy	Yes	Low	
72	River birch	Alive		39 Platy	Yes	High	Snag on one side
73	Norrhern red oak	Alive		18 Slight ridges	Yes	High	
74	River birch	Alive		31 Platy	Yes	Low	
75	River birch	Alive		22 Platy	Yes	Low	
76	Red mulberry	Alive		0 Slight ridges	Yes	Low	
77	Red mulberry	Alive		14 Slight ridges	Yes	Low	
78	Red mulberry	Alive		11 Slight ridges	Yes	Low	
79	Unknown	Alive		15 Slight ridges	Yes	Low	
80	Pin oak	Alive		9 Slight furrows	Yes	Low	
81	Americam el	Alive		14 Slight ridges	Yes	Low	
82	Honey locuar	Alive		12 Thorny	Yes	Low	
83	Americam elm	Alive		11 Slight ridgrs	Yes	Low	

FID	Species	Status	Estimated_	Bark_Type	Bark_Intac	Quality	Comments
84	Bassgood	Alive		19 Rough	Yes	Low	
85	River birch	Alive		12 Platy	Yes	Low	
86	Americam elm	Alive		12 Slight ridges	Yes	Low	
87	Nothern red pal	Alive		20 Slight ridgws	Yes	High	
88	Americam elm	Dead		14 Exfoliating	No	High	Snag
89	Hackberry	Alive		21 Roughp	Yes	Low	
90	Red ceder	Alive		9 Flaky	No	Low	
91	Americam elm	Alive		15 Slight ridges	Yes	Low	
92	Unknown	Alive		19 Slight ridges	Yes	Low	
93	Silver maple	Alive		18 Platy	Yes	High	
94	Silver maple	Alive		28 Slight ridges-flaky	Yes	High	
95	Silver maple	Alive		28 Slight ridges-flaky	Yes	High	
96	Bur oak	Alive		48 Slight ridges	Yes	High	
97	Americam elm	Dead		17 Slight ridges	No	High	
98	Red mulberry	Alive		11 Slight ridges	Yes	High	
99	Unknown	Dead		19 None	No	High	
100	Unknown	Alive		20 Slight ridges	Yes	Low	
101	Unknown	Alive		13 Slight ridges	Yes	Low	
102	River birch	Alive		12 Platy	Yes	High	
103	Pin oak	Alive		11 Slight ridges	Yes	High	
104	Northern red oak	Alive		9 Slight ridges	Yes	Low	
105	River birch	Alive		15 Platy	Yes	Low	
106	Silver maple	Alive		16 Slight ridges	Yes	High	
107	Red mulberry	Alive		11 Slight ridges	Yes	Low	
108	Unknown	Alive		15 Slight ridges	Yes	Low	
109	American elm	Alive		16 Slight ridges	Yes	Low	
110	American elm	Alive		18 Slight ridges	Yes	Low	
111	Uknown	Alive		13 slight ridges	Yes	Low	
112	Basswood	Alive		12 Slight ridges	Yes	Low	

FID	Species	Status	Estimated_	Bark_Type	Bark_Intac	Quality	Comments
113	Cottonwood	Alive		54 Deep Ridged	Yes	High	
114	Hackberru	Alive		11 Rough	Yes	High	
115	Silver maple	Dead		19 Exfoliating	No	High	
116	Cottonwood	Alive		42 Deep Ridged	Yes	High	
117	River birch	Alive		22 Platy	Yes	Low	
118	Basswood	Alive		15 Slight ridges	Yes	Low	
119	American elm	Alive		13 Slight ridges	Yes	High	
120	American elm	Alive		12 Slight ridgesp	Yes	Low	
121	American w	Alive		12 Slight ridges	Yes	Low	
122	River birch	Alive		13 Platy	Yes	Low	
123	American e	Alive		11 Slight ridges	Yes	Low	
124	Cottonwood	Alive		30 Deep Ridged	Yes	High	
125	Basswood	Alive		12 Slight ridges	Yes	Low	
126	American elm	Alive		20 Slight ridges	Yes	Low	
127	American elm	Alive		24 Slight ridges	Yes	High	Snags
128	American elm	Alive		14 Slight ridges	Yes	Low	
129	Silver maple	Alive		34 Slight ridges	Yes	High	
130	American elm	Alive		24 Slight ridges	Yes	High	
131	Hackberry	Alive		9 Deep Ridged	Yes	Low	
132	Unknown	Dead		11 Wxfpiatong	Yes	High	
133	Silver maple	Alive		11 Slight ridges	Yes	Low	
134	Cottonwood	Alive		0 Deep Ridged	Yes	High	
135	River birch	Alive		19 Platy	Yes	Low	
136	Hackberry	Alive		15 Deep Ridged	Yes	Low	
137	Uknown	Alive		9 Slight ridges	Yes	Low	
138	Basswood	Alive		13 Slight ridges	Yes	Low	
139	American elm	Alive		17 Deep Ridged	Yes	Low	
140	Unknown	Alive		14 Slight ridges	Yes	Low	
141	American elm	Alive		15 Slight ridges	Yes	Low	

FID	Species	Status	Estimated_	Bark_Type	Bark_Intac	Quality	Comments
142	American elm	Alive		15 Slight ridges	Yes	Low	
143	Hackberry	Alive		11 Deep Ridged	Yes	Low	
144	American elk	Alive		17 Ridges	Yes	Low	
145	Basswood	Alive		15 Slight ridges	Yes	Low	
146	Hackberry	Alive		14 Deep Ridged	Yes	Low	
147	Basdwood	Alive		12 Slightly ridges p	Yes	Low	
148	American elm	Alive		19 Slight ridges	Yes	Low	
149	American elm	Alive		20 Slight ridges	Yes	Low	
150	American elm	Alive		22 Ridges	Yes	High	
151	Hackberry	Alive		11 Deep Ridged	Yes	Low	
152	Basswood	Alive		12 Slight ridges	Yes	Low	
153	American elm	Alive		14 Slight ridges	Yes	Low	
154	Mulberry	Alive		11 Slight ridges	Yes	Low	
155	American elm	Alive		15 Slight ridges	Yes	Low	
156	American elm	Alive		17 Slight ridges	Yes	Low	
157	Basswood	Alive		12 Slight ridges	Yes	Low	
158	Basswood	Alive		11 Slight ridges	Yes	Low	
159	Silver maple	Alive		28 Slight ridges	Yes	High	
160	Silver maple	Alive		48 Slight ridges	Yes	High	
161	Silver maple	Alive		39 S	Yes	High	
162	Box elder	Alive		9 Slight ridges	Yes	Low	
163	American elm	Alive		14 Slight ridges	Yes	Low	
164	American elm	Alive		9 Slight ridges	Yes	Low	
165	Swamp white oak	Alive		10 Slight ridges	Yes	High	
166	American elm	Alive		17 Slight ridges	Yes	Low	
167	Basswood	Alive		14 Slight ridges	Yes	Low	
168	Basswood	Alive		15 Slight ridges	Yes	Low	
169	Basswood	Alive		15 Slight ridges	Yes	Low	
170	American elm	Alive		12 Slight ridges	Yes	Low	

FID	Species	Status	Estimated_	Bark_Type	Bark_Intac	Quality	Comments
171	Basswood	Alive		9 Slight ridges	Yes	Low	
172	Basswood	Alive		12 Slight ridges	Yes	Low	
173	Basswood	Alive		11 Slight ridges	Yes	Low	
174	Silver maple	Alive		10 Slight ridges	Yes	Low	
175	River birch	Alive		16 Platy	Yes	Low	
176	Unknown	Alive		20 S	Yes	Low	
177	Silver maple	Alive		14 Slight ridges	Yes	Low	
178	Basswood	Alive		12 Slight ridges	Yes	Low	
179	American elm	Alive		9 Slight ridges	Yes	Low	
180	American elm	Alive		10 Slight ridges	Yes	Low	
181	American elm	Alive		13 Slight ridges	Yes	Low	
182	Basswood	Alive		17 Deep Ridged	Yes	Low	
183	American elm	Alive		17 Ridges	Yes	Low	
184	Basswood	Alive		12 Slight ridges	Yes	Low	
185	Cottonwoos	Alive		14 Ridges	Yes	High	
186	Cottonwood	Alive		17 Ridges	Yes	High	
187	American elm	Alive		15 Slight ridges	Yes	Low	
188	Unknown	Alive		24 Slight ridges	Yes	Low	
189	American elm	Alive		12 Slight ridges	Yes	Low	
190	Basswood	Alive		11 Slight ridges	Yes	High	
191	Unknown	Dead		15 Nkne	No	High	Snag
192	Basswood	Alive		12 Slight ridges	Yes	Low	
193	Silver maple	Alive		15 Flaky	Yes	High	
194	Basswood	Alive		12 Slight ridges	Yes	Low	
195	Basswood	Alive		12 Slight ridges	Yes	Low	
196	River birch	Alive		22 Platy	Yes	High	1 snag
197	River birch	Alive		14 Platy	Yes	Low	
198	Unknown	Dead		22 Exfolitong	No	High	
199	Northern res oak	Alive		23 Slight ridges	Yes	High	

FID	Species	Status	Estimated_	Bark_Type	Bark_Intac	Quality	Comments
200	Cottonwood	Alive		23 Deep Ridged	Yes	High	
201	Bur oak	Alive		13 Slight ridges	Yes	High	
202	Unknown	Alive		27 Ridges	Yes	Low	
203	American e	Dead		12 Slight ridges	Yes	High	
204	Silver maple	Alive		0 Flaky	Yes	High	
205	Northern red oak	Alive		14 Slight ridges	Yes	High	
206	River birch	Alive		15 Platy	Yes	High	
207	Silver maple	Alive		0 Slight ridges	Yes	High	
208	Silver maple	Alive		26 Flaky	Yes	High	
209	Silver maple	Dead		28 Slight ridges	Yes	High	Snag
210	Silver maple	Alive		45 Flaky	Yes	High	
211	Silver maple	Alive		12 Flaky	Yes	High	
212	Silver maple	Alive		27 Slight ridges	Yes	High	
213	River birch	Alive		30 Platy	Yes	Low	
214	River birch	Alive		30 Platy	Yes	Low	
215	Hackberry	Alive		14 Deep Ridged	Yes	Low	
216	Northern red oak	Alive		12 Slight ridges	Yes	High	
217	Silver maple	Alive		12 S	Yes	Low	
218	Silver maple	Alive		35 Flaky	Yes	High	
219	Northern red oak	Alive		15 Slight ridges	Yes	High	
220	Silver maple	Alive		16 Flaky	Yes	High	
221	Silver maple	Alive		9 Slight ridges	Yes	Low	
222	American elm	Alive		10 Slight ridges	Yes	Low	
223	Unknown	Alive		10 Slight ridges	Yes	Low	
224	Basswood	Alive		13 Slight ridges	Yes	Low	
225	Northern red oak	Alive		15 Slight ridges	Yes	High	
226	River birch	Alive		16 P	Yes	Low	
227	Silver maple	Alive		16 Flaky	Yes	High	
228	American elm	Alive		20	Yes	Low	

FID	Species	Status	Estimated_	Bark_Type	Bark_Intac	Quality	Comments
229	River birch	Alive		14 Platy	Yes	Low	
230	River birch	Alive		11 Platy	Yes	Low	
231	American elm	Alive		11 Slight ridges	Yes	High	
232	River birch	Alive		14 Platy	Yes	Low	
233	River birch	Alive		14 Platy	Yes	High	
234	Notthorn red oak	Alive		30 Ridges	Yes	High	
235	Bur oal	Alive		42 Slight ridges	Yes	High	
236	Bur oak	Alive		50 Slight ridges	Yes	High	
237	River birch	Alive		12 Platy	Yes	Low	
238	River birch	Alive		10 Platy	Yes	Low	
239	River birch	Alive		12 Platy	Yes	Low	
240	River birch	Alive		11 Platy	Yes	Low	
241	River birch	Alive		13 Platy	Yes	Low	
242	River birch	Alive		14 Platy	Yes	Low	
243	River birch	Alive		9 Platy	Yes	Low	
244	River birch	Alive		10 Platy	Yes	Low	
245	River birch	Alive		13 Platy	Yes	Low	
246	River birch	Alive		10 Platy	Yes	Low	
247	River birch	Alive		9 Platy	Yes	Low	
248	River birch	Alive		10 Platy	Yes	Low	
249	Bur oak	Alive		20 Ridges	Yes	High	
250	River birch	Alive		15 Platy	Yes	Low	
251	Shgbark hickory	Alive		14 Flaky	Yes	High	
252	River birch	Alive		0 Platy	Yes	Low	
253	River birch	Alive		11 Platy	Yes	Low	
254	River birch	Alive		10 Platy	Yes	Low	
255	River birch	Alive		12 Platy	Yes	Low	
256	Basswood	Alive		12 Slight ridges	Yes	Low	
257	Silver maple	Alive		9 Slight ridges	Yes	Low	

FID	Species	Status	Estimated_	Bark_Type	Bark_Intac	Quality	Comments
258	Hackberry	Alive		10 Deep Ridged	Yes	Low	
259	River birch	Alive		15 Platy	Yes	Low	
260	Hackberry	Alive		11 Ridges	Yes	High	
261	River birch	Alive		20 Platy	Yes	Low	
262	Northern red oak	Alive		4 Slight ridges	Yes	High	
263	Silver maple	Alive		11 Roughp	Yes	Low	
264	Cedar	Alive		10 Rough	Yes	Low	
265	White oak	Alive		9 Slight ridges	Yes	High	
266	Northern red oak	Alive		9 Slight ridges	Yes	High	
267	Bur oak	Alive		10 Slight ridges	Yes	High	
268	Bur oak	Alive		64 Deep Ridged	Yes	High	
269	Northern red oak	Alive		11 Slight ridges	Yes	High	
270	Northern red oak	Alive		14 Slight ridges	Yes	High	
271	Shag bark hickory	Alive		9 Smooth	Yes	Low	
272	Bur oak	Alive		65 Slight ridges	Yes	High	
273	Northern red oak	Alive		9 Slight ridges	Yes	High	
274	Hickory	Alive		14 Slight ridges	Yes	High	
275	Shagbark hickory	Alive		14 Flaky	Yes	High	
276	Shagbark hickory	Alive		15 Flaky	Yes	High	
277	Bur oak	Alive		9 Slight ridges	Yes	High	
278	Honey locust	Alive		14 Thorns	Yes	Low	
279	Mulberry	Alive		10 Slight ridges	Yes	Low	
280	River birch	Alive		10 Platy	Yes	Low	
281	River birch	Alive		10 Platy	Yes	High	
282	American elm	Alive		12 Slight ridges	Yes	Low	
283	American elm	Alive		11 Slight ridges	Yes	Low	
284	American elm	Alive		12 Slight ridges	Yes	High	
285	American elm	Alive		12 Slight ridges	Yes	Low	
286	Box elder	Alive		10 Slight ridges	Yes	Low	

FID	Species	Status	Estimated_	Bark_Type	Bark_Intac	Quality	Comments
287	Unknown	Alive		12 Slight ridges	Yes	Low	
288	American elm	Alive		11 Slight ridges	Yes	Low	
289	American elm	Alive		9 Slight ridges	Yes	Low	
290	Box elder	Alive		14 Deep Ridged	Yes	Low	
291	Honey locust	Alive		10 Thorny	Yes	Low	
292	Unknown	Alive		12 Ridges	Yes	Low	
293	Unknown	Alive		17 Deep Ridged	Yes	Low	
294	American elm	Alive		10 Slight ridges	Yes	Low	
295	River birch	Alive		14 Platy	Yes	Low	
296	Northern red oak	Alive		40 Ridges	Yes	High	
297	River birch	Alive		21 Platy	Yes	Low	
298		Alive		0	Yes	High	
299	Swamp white ok	Alive		9 Slight ridges	Yes	High	
300	Unknown	Alive		10 Slight ridges	Yes	Low	
301	Box elder	Alive		17 Slight ridges	Yes	Low	
302	Box elder	Alive		19 Slight ridges	Yes	Low	
303	Siberian elm	Alive		10 Slight ridges	Yes	Low	
304	River birch	Alive		13 Platy	Yes	Low	
305	Hackberry	Alive		12 Deep Ridged	Yes	Low	
306	Honey locust	Alive		15 Slight ridges	Yes	Low	
307	Unknown	Alive		12 Slight ridges	Yes	Low	
308	American elm	Alive		11 Slight ridges	Yes	Low	
309	River birch	Alive		15 Platy	Yes	Low	
310	River birch	Alive		10 Platy	Yes	Low	
311	River birch	Alive		10 Platy	Yes	Low	
312	Hackberru	Alive		40 Ridges	Yes	High	
313	White oak	Alive		15 Slight ridges	Yes	High	
314	Hackberry	Alive		10 Ridges	Yes	Low	
315	River birch	Alive		10 Platy	Yes	Low	

FID	Species	Status	Estimated_	Bark_Type	Bark_Intac	Quality	Comments
316	Hackberry	Alive		21 Ridges	Yes	Low	
317	Unknown	Alive		12 Exfoiating	Yes	High	
318	Unknown	Dead		22 Exfoliating	No	High	
319	Northern red oak	Alive		42 Slight ridges	Yes	High	
320	Silver maple	Alive		45 Slight ridges	Yes	High	
321	Unknown	Alive		11 Slight ridges	Yes	Low	
322	American elm	Alive		10 Slight ridges	Yes	Low	
323	Unknown	Alive		19 Slight ridges	Yes	Low	
324	Siberian elm	Alive		12 Slight ridges	Yes	Low	
325	Unknown	Alive		16 Ridges	Yes	Low	
326	River birch	Alive		10 Platy	Yes	Low	
327	American elm	Alive		11 Slight ridges	Yes	High	
328	River birch	Alive		12 Platy	Yes	Low	
329	Honey locust	Alive		19 Thorny	Yes	Low	
330	River birch	Alive		12 Platy	Yes	Low	
331	Hackberry	Alive		14 Deep Ridged	Yes	Low	
332	River birch	Alive		10 Platy	Yes	Low	
333	Basswood	Alive		19 Slight ridges	Yes	Low	
334	Mulberry	Alive		21 Slight ridges	Yes	Low	
335	Mulberry	Alive		23 Slight ridges	Yes	Low	
336	Unknown	Alive		24 Slight ridges	Yes	Low	
337	Green ash	Alive		12 Slight ridges	Yes	Low	
338	Unknown	Alive		12 Slight ridges	Yes	Low	
339	Box eldee	Alive		15 Sl	Yes	Low	
340	Siberian elm	Alive		12 Slight ridges	Yes	Low	
341	Basswood	Alive		14 Ridges	Yes	Low	
342	Unknown	Alive		13 Ridges	Yes	High	
343	Green ash	Alive		9 Slight ridges	Yes	Low	
344	Apple	Alive		21 Smooth	Yes	High	

FID	Species	Status	Estimated_	Bark_Type	Bark_Intac	Quality	Comments
345	Box elder	Alive		16 Slight ridges	Yes	Low	
346	River birch	Alive		16 Platy	Yes	Low	
347	Unknown	Dead		26 Exfoliating	Yes	Low	
348	Mulberry	Alive		21 Slight ridges	Yes	Low	
349	Box elder	Alive		19 Slight ridges	Yes	Low	
350	Basswood	Alive		25 Slight ridges	Yes	Low	
351	Mulberry	Alive		23 Slight ridges	Yes	Low	
352	Basswood	Alive		12 Slight ridges	Yes	Low	
353	Basswood	Alive		14 Slight ridges	Yes	Low	
354	River birch	Alive		31 Platy	Yes	Low	
355	Basswood	Alive		15 Slight ridges	Yes	High	
356	River birch	Alive		17 Place	Yes	Low	
357	River birch	Alive		12 Platy	Yes	Low	
358	Unknown	Alive		19 Slight ridges	Yes	Low	
359	American elm	Alive		19 Slight ridges	Yes	Low	
360	River birch	Alive		21 Platy	Yes	Low	
361	Basswood	Alive		14 Slight ridges	Yes	Low	
362	Green ash	Alive		15 Slight ridges	Yes	Low	
363	Honey locust	Alive		13 Thorny	Yes	Low	
364	Honey locust	Alive		11 Smooth	Yes	Low	
365	Honey locust	Alive		23 Thorny	Yes	Low	
366	Green ash	Alive		25 Slight ridges	Yes	Low	

APPENDIX B: BAT HABITAT ASSESSMENT DATA FORM

APPENDIX A
PHASE 1 SUMMER HABITAT ASSESSMENTS

INDIANA BAT HABITAT ASSESSMENT DATASHEET

Project Name: _____ Date: _____

Township/Range/Section: _____

Lat Long/UTM/ Zone: _____ Surveyor: _____

Brief Project Description

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Project Area

	Total Acres	Forest Acres		Open Acres
Project				
Proposed Tree Removal (ac)	Completely cleared	Partially cleared (will leave trees)	Preserve acres- no clearing	

Vegetation Cover Types

Pre-Project	Post-Project

Landscape within 5 mile radius

Flight corridors to other forested areas?
Describe Adjacent Properties (e.g. forested, grassland, commercial or residential development, water sources)

Proximity to Public Land

What is the distance (mi.) from the project area to forested public lands (e.g., national or state forests, national or state parks, conservation areas, wildlife management areas)?
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APPENDIX A PHASE 1 SUMMER HABITAT ASSESSMENTS

Use additional sheets to assess discrete habitat types at multiple sites in a project area

*Include a map depicting locations of sample sites if assessing discrete habitats at multiple sites in a project area
A single sheet can be used for multiple sample sites if habitat is the same*

Sample Site Description
Sample Site No.(s): _____

Water Resources at Sample Site				
Stream Type (# and length)	Ephemeral	Intermittent	Perennial	Describe existing condition of water sources:
Pools/Ponds (# and size)	Open and accessible to bats?			
Wetlands (approx. ac.)	Permanent	Seasonal		

Forest Resources at Sample Site				
Closure/Density	Canopy (> 50')	Midstory (20-50')	Understory (<20')	1=1-10%, 2=11-20%, 3=21-40%, 4=41-60%, 5=61-80%, 6=81-100%
Dominant Species of Mature Trees				
% Trees w/ Exfoliating Bark				
Size Composition of Live Trees (%)	Small (3-8 in)	Med (9-15 in)	Large (>15 in)	
No. of Suitable Snags				

Standing dead trees with exfoliating bark, cracks, crevices, or hollows. Snags without these characteristics are not considered suitable.

IS THE HABITAT SUITABLE FOR INDIANA BATS? _____

Additional Comments:

Attach aerial photo of project site with all forested areas labeled and a general description of the habitat

Photographic Documentation: habitat shots at edge and interior from multiple locations; understory/midstory/canopy; examples of potential suitable snags and live trees; water sources