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DAVE'S POND: HISTORY OF A SIGNIFICANT INDIANA HERPETOLOGICAL SITE

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ABSTRACT. Dave's Pond, 1 ¼ miles NE of Sandcut in northeastern Vigo County, Indiana, is compared to "Sand Hill", now part of Deming Park on the eastern edge of Terre Haute, Indiana, which was a favored collecting site of the naturalist W. S. Blatchley in the 1890s. Both sites lie at the juncture of Illinoian uplands and Wisconsinan lowlands, have sandy soils, and include ponds, woods, and meadows. At Sand Hill, Blatchley collected 35 species of amphibians and reptiles; some have not been found elsewhere in Vigo County and some are probably no longer extant in the county. In comparison, Dave's Pond yielded 21 species of amphibians and reptiles including the state endangered crawfish frog (*Lithobates areolatus*); the spadefoot toad (*Scaphiopus holbrookii*), which had previously been known in Indiana no closer than 65 miles to the southeast; the newt (*Notophthalmus viridescens*), which has not been found recently at any other locality in Vigo County or the surrounding counties in Indiana and Illinois; and Kirtland's snake (*Clonophis kirtlandii*), another species of special concern. The Dave's Pond population of crawfish frogs is the only known extant population in Vigo County and may be the most northern extant population in the state. Most species of pond breeding amphibians found in Vigo County were found at both Sand Hill and Dave's Pond. Sand Hill has been considerably altered and no longer has the habitat or the herpetofauna that existed in the 1890s. Dave's Pond, while degraded to some extent, remains a significant herpetological site.

Keywords: Dave's Pond, amphibians and reptiles, Vigo County, Sand Hill

BACKGROUND

Over a century ago, in the 1880s and '90s, the famous Naturalist/Biologist/Geologist Willard S. Blatchley roamed Indiana, spending a good deal of time in Vigo County. He taught for many years at Wiley High School in Terre Haute while studying the biota and geology of the state. He was State Geologist of Indiana but was most famous for his works in entomology. He also published his work on plants, birds, mammals, reptiles and amphibians.

In two papers on the amphibians and reptiles of Vigo County, Blatchley (1891, 1899) recorded 52 species. Some of his favorite collecting areas were "the bluffs overlooking five mile pond, Hecklund Prairie, and Sand Hill," all near Terre Haute. A small portion of the bluffs overlooking Five Mile Pond has now been preserved as Little Bluestem Prairie.

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Hecklund Prairie was along the railroad tracks just SW of the Rio Grande School but was lost to farming operations in the 1980s. Sand Hill was on the south edge of current Deming Park, at the east end of Terre Haute where Poplar Street passes over a knoll. Blatchley described Sand Hill as a 40 acre woodland pasture with thick underbrush and several shallow ponds. The soil, he said, was a loose, sandy, black loam. At Sand Hill, Blatchley (1891, 1899) collected 35 species of amphibians and reptiles, several of which are currently either rare or no longer extant in Vigo County (ex. *Hemidactylium scutatum*, *Notophthalmus viridescens*, *Ambystoma jeffersonianum*); he felt the area was so productive because here "the upland met the lowland."

Blatchley's "lowland" is actually the old floor of the glacial Wabash River, and the "upland" is its shore. During the Illinoian glaciation, Vigo County was completely covered by glacial drift. This material, still present in the "upland," produced a clayey loam soil which Shannon (1911) referred to as "Knox silt

loam.'' Later, during the Wisconsinan glaciation, when the Wabash River served as a glacial spillway, the Wisconsinan melt waters washed away the clayey loam in the river valley and laid down stratified deposits with sand lying on top of gravel. The soil of these deposits is a black sandy loam which Shannon (1911) called ''Sioux sandy loam.'' The present Wabash River is incised in these stratified deposits.

Blatchley's Sand Hill is now a much disturbed and degraded site, and has been for many years. The environment in which Blatchley collected is gone, as are most of the amphibians and reptiles. But knowledge of a comparable site in Vigo County emerged in the 1960s, and, while degraded to some extent, this site is still significant for its herpetological diversity. The site, Dave's Pond, is the subject of this paper.

DAVE'S POND

Dave's Pond is farther north than Sand Hill but is also along the shore of the glacial Wabash River. It is located on farmland about 5 miles NE of Terre Haute and about 1 ¼ miles E of Sandcut on the Rio Grande Road (Rosedale Quadrangle, T 14 N, R 8 W, in the south-central portion of section 16). There are actually three ponds: the northern pond (Dave's Pond) is about ¼ mile north of the road, the middle pond (Scaphiopus Pond) is at the edge of the road to the north, and the third pond (Areolatus Pond) is at the edge of the road to the south. They lie amidst meadows and a small woods. Dave's Pond retains water all year round, while the two ponds along the road are temporary.

The Dave's Pond site, as it existed in the mid-1960s, was described by Rubin (1965a) as follows: ''The pond near Sandcut covers one eighth of an acre. It nearly dries in late summer after partially filling with aquatic vegetation, particularly arrowleaf (*Sagittaria* sp.). South of the pond is a meadow which floods with the rains of March and April but dries in the beginning of June. Southeast of the pond is an open woods which harbors some flood pools after heavy rains.''

Since the 1960s, there has been some degradation of the habitat, but much of the original conditions and the original herpetofauna remain. Perhaps the most serious degradation occurred in the late 1960s and early 1970s. The woods was significantly thinned and much of its undergrowth removed, and a residence was built in it. During much of the year, the woods may have served as the reservoir for the eft stage of the newt, for some of the mole salamanders (*Ambystoma* spp.), and for species such as the wood frog (*Lithobates sylvaticus*). Indeed, the newt (*Notophthalmus viridescens*) and the spotted salamander (*Ambystoma maculatum*) have not recently been found at the site and may very well be extirpated here. Regardless, Dave's Pond remains a significant herpetological site.

''Dave'' is Dave Rubin, the junior author of this paper. Dave was a graduate student at Indiana State University (ISU) from 1963 to 1969, and the first Ph.D. student of senior author John O. Whitaker, Jr., who started his career on the faculty at ISU in 1962. Dave's master's thesis (Rubin 1965a) was a survey of the amphibians and reptiles of Vigo County. Dave was working two sites near Burnett, Indiana, in northeastern Vigo County that had several species of frogs calling from temporary pools. One evening in late March 1964, while travelling to the Burnett sites, he heard a strange frog call in a flooded meadow along the Rio Grande Road, about 1 ¼ miles E of Sandcut. It was the crawfish frog, *Lithobates areolatus*, uncommon then, and now an Indiana state endangered species. That was the first of many visits to this locality. On April 6 of the same year, at this site, Earl Zimmerman, an undergraduate student of Whitaker, and later Chairman of the Biological Sciences Department at North Texas State University, collected a single crawfish frog. Rubin returned to the site the same evening, along with another student, Phil Evers, and found a single spadefoot toad, *Scaphiopus holbrookii*, in the flooded meadow. The authors found breeding choruses there two weeks later. At that time, the closest known Indiana locality for spadefoots was 65 miles to the southeast. The spadefoot range extension was reported by Rubin (1965b). Over the next few years, the site was often visited and many species were added to the list of those found there. In total, 21 herpetofaunal species–15 amphibians (including most of the pond-breeding species known from Vigo County) and 6 reptiles–were found at the site. Besides crawfish frogs and spadefoot toads, they included the newt (*Notophthalmus viridescens*), which had not been reported for Vigo County (or any adjacent counties) since Blatchley's 1890s Sand Hill record, and Kirtland's snake (*Clonophis kirtlandii*), another species of special concern in Indiana.

Table 1.—Comparison of the species of amphibians and reptiles found at Sand Hill (Blatchley 1891; 1899) and at Dave's Pond. X = certain; P = probable.

Species	Common name	Sand Hill	Dave's Pond
Ambystoma jeffersonianum	Jefferson salamander	X	
Ambystoma maculatum	spotted salamander	X	X
Ambystoma opacum	marbled salamander	X	
Ambystoma texanum	small-mouthed salamander	X	X
Ambystoma tigrinum	eastern tiger salamander	X	X
Notophthalmus viridescens	eastern newt	X	X
Hemidactylium scutatum	four-toed salamander	X	
Plethodon cinereus	red-backed salamander	X	
Plethodon glutinosus	northern slimy salamander	X	
Scaphiopus holbrookii	eastern spadefoot toad		X
Anaxyrus fowleri	Fowler's toad	P	X
Acris crepitans	eastern cricket frog	X	X
Hyla versicolor	gray treefrog	X	X
Pseudacris crucifer	spring peeper	X	X
Pseudacris triseriata	western chorus frog	X	X
Lithobates areolatus	crawfish frog		X
Lithobates catesbeianus	American bullfrog	P	X
Lithobates clamitans	green frog	P	X
Lithobates sphenocephalus	southern leopard frog	P	X
Lithobates sylvaticus	wood frog	P	X
Chelydra serpentina	snapping turtle	P	X
Chrysemys picta	painted turtle	P	X
Terrapene carolina	eastern box turtle	P	X
Carphophis amoenus	common worm snake	X	
Clonophis kirtlandii	Kirtland's snake	X	X
Heterodon platirhinos	eastern hognose snake		X
Lampropeltis calligaster	prairie kingsnake	X	
Nerodia sipedon	common water snake	P	X

* Besides the 25 species listed above as certain or probable for Sand Hill, Blatchley saw an additional 10 species there. Possibilities for these additional 10 species include one frog (*Lithobates palustris*), one turtle (*Apalone spinifer*), one lizard (*Plestiodon* sp.), and eleven snakes (including *Heterodon platirhinos* listed in the table above). See the text for further discussion. Common and scientific names follow Crother et al. 2012.

Rubin in 1973 published the material from his master's thesis. Earlier, Rubin (1968) reported on amphibian breeding dates in Vigo County based largely on data from the site. Some of these records were cited by Minton (1972). Whitaker et al. (1977) compared the food habits of four species of spadefoot toads; the specimens of *Scaphiopus holbrookii* used in this study were all from Vigo County and largely from the Dave's Pond site.

From 1963 to 1969, Whitaker (1971) and students in his herpetology classes conducted research on the western chorus frog (*Pseudacris triseriata*) in Vigo County. Most data were collected from a pond NE of Terre Haute that was referred to as the "Pseudacris Pond," but considerable data from Dave's Pond were included. In this work, the locality NE of Sandcut was first referred to, in print, as "Dave's Pond."

Subsequent researchers, and herpetology class students, have often visited Dave's Pond. The most recent references to it are included in reports on the status of the crawfish frog in Indiana (Engbrecht and Lannoo 2010; Engbrecht et al. 2012). Engbrecht et al. (2012) indicated that Dave's Pond contains the only known remaining population of this species in Vigo County, and perhaps the northernmost remaining population in the state.

HERPETOFAUNA OF DAVE'S POND

The 21 herpetofaunal species recorded from the Dave's Pond site from 1964 through 1966 included four salamanders, eleven anurans, three turtles, and three snakes. These are listed in Table 1, along with a comparison to the list of species most likely found by Blatchley (1891, 1899) at Sand Hill. After repeated visits in the

mid-1960s, the Dave's Pond area was frequently visited by Whitaker and his students in herpetology classes from the late 1960s into the early 2000s. Changes in ownership of the property subsequently affected the ability to access the site.

Rubin (1968) summarized amphibian pond breeding in Vigo County based largely on observations at Dave's Pond and another site about two miles away: The first spring breeder is *Ambystoma texanum* which may breed during warm spells in January and February and peaks in early March. *Ambystoma maculatum* and *A. tigrinum* breed through March with the peak in mid-March. The first frogs to call are *Pseudacris triseriata* and *Pseudacris crucifer*, beginning at the end of February, with *Lithobates pipiens*, *L. sylvaticus*, and *L. areolatus* joining in that order during March. Breeding in April is dominated by *Hyla versicolor*, *Anaxyrus woodhousii*, and *Acris crepitans*. *Lithobates clamitans* breeds in May and June and *L. catesbeianus* breeds later in the summer.

Comments on the individual species found at Dave's Pond follow:

Salamanders

Ambystoma maculatum (spotted salamander)**.**—Several spotted salamanders were collected during intensive work at Dave's Pond in April 1964 (ISU 20, 22) and March and April 1965 (ISU 863, 874, 882, 883, 938), but this species was quite scarce then compared to the tiger salamander, and especially to the small-mouthed salamander. The spotted salamander has not been seen there since 1965 and is likely extirpated from that site, perhaps as a consequence of degradation of the woods adjacent to the main pond. Until recently, Dave's Pond and Sand Hill were the only known Vigo County localities for the spotted salamander, which is now likely gone from both sites. However, another Vigo County locality for the spotted salamander has subsequently been found. A site in Seelyville, with several small ponds, yielded this species in 2002, 2003, 2004, and 2006 (Foster, pers. comm. 2013). One collected there on March 9, 2002, is in the ISU Vertebrate Collection (ISU 4091). The Seelyville site is 1.25 km N and 1 km E of the intersection of US 40 and North Road, and approximately 4.75 miles from Dave's Pond.

A. texanum (small-mouthed salamander)**.**—Of the three species of *Ambystoma* taken at Dave's Pond, the small-mouthed salamander was by far the most numerous. This species is widely distributed in Vigo County, and often seen in large numbers during breeding season. It is also the earliest ambystomid to migrate to the breeding ponds with peak breeding activity in February and early March. Many voucher specimens from Dave's Pond are in the ISU Vertebrate Collection. Use of minnow traps at Dave's Pond resulted in 64 captures from January 31 through March 9, 1974, and 161 captures from February 13 through March 7, 1976. Use of minnow traps at Scaphiopus Pond resulted in 123 captures from February 13 through March 7, 1976; 20 captures from February 20 through March 27, 1986; and 69 captures from February 16 through April 20, 1992.

A. tigrinum (Eastern tiger salamander)**.**—The tiger salamander is reasonably common at Dave's Pond, but is not as numerous as the small-mouthed salamander. Voucher specimens of adults were taken at Dave's Pond in 1964 (ISU 24), 1965 (ISU862, 868, 909, 923), 1972 (ISU 2609), 1974 (ISU 2836-37, 3163-65, 3185-90), and 1975 (ISU 3337, 3339). All were taken between late February and early April. Larvae collected by seining on June 30, 1964, were also preserved (ISU 24, 26, 28). Use of minnow traps at Dave's Pond by Whitaker's herpetology class from February 24 through April 4, 2000 resulted in 51 captures of tiger salamanders, of which 50 were males and one was a female, although some may have been recaptures. The first capture was on February 24 and the last was on March 24. Nearly half (23 of 51) of the captures occurred during the last five days of February.

Data collected by Whitaker and his herpetology class in 1976 gives good insight into the relative abundance of small-mouthed and tiger salamanders at Dave's Pond. Using minnow traps, the class worked at both Dave's Pond proper and Scaphiopus Pond. Traps were first set on February 14 and were removed on March 17. At Dave's Pond, total captures were 161 individuals of *A. texanum* and 27 of *A. tigrinum*. At Scaphiopus Pond, total captures were 123 individuals of *A. texanum* and 13 of *A. tigrinum*. For *A. texanum*, approximately 90% of captures were between February 17 and February 22. Captures of *A. tigrinum* were more evenly spread over the time period.

Notophthalmus viridescens (Eastern newt)**.**—A larval newt (ISU 58) was taken from Dave's Pond on March 25, 1964. This was the first record of the newt for Vigo County since Blatchley recorded it for Sand Hill. This was also significant in view of the lack of recent records for adjacent areas in Indiana and Illinois (Minton, 1972, 2001; Smith, 1961). Three adults (ISU 870) were taken from the pond on March 4, 1965, and another on April 5, 1965. Additional newts were taken in February and March 1966; March 1967; March and April 1972; and January, February, and March 1974. Most of these specimens are in the ISU Vertebrate Collection (ISU 1440, 1442, 1448, 1834, 2610-13, 2802, 2825, 2835, 3166, 3184). Those collected in 1972 included 24 individuals that were caught using minnow traps. No specimens of this species have been taken at Dave's Pond since 1974. Modification of the adjacent woods, eliminating appropriate habitat for the eft stage, may have doomed this species at Dave's Pond.

Anurans

Foster (pers. comm. 2013) also informed us that Nathan Engbrecht heard spadefoots calling at 10 locations in Vigo and Parke counties in 2011 or 2012. Specimens in the ISU Vertebrate Collection from Dave's Pond are from April, May, and June 1964 (ISU 325-32, 2970); May and July 1965 (ISU 1030, 1065, 1220-21); April and May 1966 (ISU 1499, 1502-03, 1507, 1512).

Scaphiopus holbrookii (eastern spadefoot)**.**—The spadefoot is listed as a species of ''Special Concern'' in Indiana. When first discovered at Dave's Pond in April 1964, the new Vigo County record represented an extension of the known range of the species by about 65 miles to the northwest of the closest localities in south-central Indiana (Rubin 1965b). Since its discovery at Dave's Pond, the spadefoot has been found at a number of other Vigo County localities and at least one locality (Parke County 750 W road between Lyford and Clinton) in Parke County to the north (Foster); and May 1967 (ISU 1859).

Most of the species in this genus inhabit the arid western U.S, spend most of their lives underground, and breed only in temporary pools created by heavy rains. While not living under arid conditions, the eastern spadefoot follows the same pattern–breeding seems tied to rainfall more than to season, temporary pools are used almost exclusively, and both breeding and the larval period are very much compressed. Rubin (1968) reported spadefoot breeding at the Dave's Pond site from April 19 to 21, 1964; on July 9, 1965; and on April 27-28, 1966. No breeding activity was observed in 1967, even though the site was repeatedly visited. The flooded pasture (Scaphiopus Pond) was utilized in 1964 and 1965; in 1966, the breeding congregation was found in flood pools in the woods. Rubin (1965b, 1968) reported finding fully transformed toadlets in May 1964 only 37 days after the first known breeding at the site.

Anaxyrus fowleri (Fowler's toad)**.**—Fowler's toad is common at Dave's Pond. Voucher specimens in the ISU Vertebrate Collection are from 1964, 1965, and 1972 with dates from mid-April into July. Rubin (1965a) first heard this species calling at Dave's Pond in 1964 on April 20; it was still present in large numbers on July 7. ISU 3246 includes 35 adults collected on April 19, 1972, indicating that this species was breeding at Dave's Pond on that date.

Acris crepitans (Eastern cricket frog)**.**—The eastern cricket frog is the least abundant hylid found at Dave's Pond. Rubin (1965a) noted that this species was widespread in Vigo County, but was (most) often seen along creeks during autumn. Rubin first observed this species in 1964 at Dave's Pond on May 14. The herpetology class heard approximately 15 calling at Scaphiopus Pond on May 3, 1972, and 4 to 8 calling two weeks later on May 17. Voucher specimens are from May 14, 1964 (ISU 233); April 15, 1969 (ISU 2817); April 21, 1972 (ISU 3260); and May 18, 1972 (ISU 3180, 3236).

Hyla chrysoscelis (Gray treefrog)**.**—The gray treefrog breeds later than the chorus frog and spring peeper, but earlier than the cricket frog. It is common at Dave's Pond, but far less abundant than the chorus frog and spring peeper. Voucher specimens in the ISU Vertebrate Collection are from 1964, 1965, 1966, 1969, 1972, 1974, and 1980. All were collected between April 15 and July 7. Rubin (1965a) reported this species first calling at Dave's Pond in 1964 on April 19, and he also heard it on July 7, the last day he visited the site that year. Rubin (1968) also reported that this species often called from ''on top of arrowleaf leaves.'' Whitaker's herpetology class reported gray treefrogs calling at Scaphiopus Pond on May 16 and May 17.

Pseudacris crucifer (spring peeper)**.**—The spring peeper is abundant at Dave's Pond. Voucher specimens are from 1965, 1969, 1972, 1974, and 2002. Rubin (1965a) reported first hearing the peeper call at Dave's Pond in 1964 on March 15, and hearing it for the last time that year on April 27. The 1972 herpetology class reported hearing this species at Scaphiopus Pond on many days between March 4 and May 8, with "numerous" individuals present on March 4, 8, and 28. The 1974 herpetology class reported this species calling at Scaphiopus Pond on February 18, March 3, and from April 3 to 21. Estimated numbers on April 10, 14, 17, and 21 were 200, 300, 200, and 150, respectively. In 2002, Whitaker heard 2 peepers calling at Scaphiopus Pond on February 13. On March 7, he heard about 25 calling at Dave's Pond and numerous individuals calling at Scaphiopus and Areolatus Ponds. He heard full choruses of peepers at Scaphiopus Pond on April 1 and at Scaphiopus and Areolatus Ponds on April 5.

P. triseriata (western chorus frog)**.**—The chorus frog is abundant at Dave's Pond. Voucher specimens are from 1964, 1965, 1966, 1967, 1969, 1972, 1974, 1979, and 1980. With the exception of a recently transformed individual collected on May 26, 1964 (ISU 291), all voucher specimens were taken in March and April. Rubin (1965a) reported this species first calling at Dave's Pond in 1964 on March 15 and last calling on April 27. For 1965, he reported it first calling there on March 2. On March 4, 1965, Dave's Pond was half covered with ice; water temperature was 1 C and air temperature was 20 to 25 F. Seining that day yielded 1 chorus frog (ISU 871) along with 12 *Ambystoma texanum*, 5 *A. tigrinum*, 1 *A. maculatum*, 3 *Notophthalmus viridescens*, and 3 *Lithobates sphenocephalus*. In 1972, Whitaker's herpetology class found chorus frogs calling in large numbers, estimated several times at 100 to 200, at Scaphiopus Pond from March 15 to April 14. In 1974, the herpetology class recorded chorus frogs at Scaphiopus and Areolatus Ponds from February 22 to April 1; the first full chorus was on March 3 and the last on March 28. In 2002, Whitaker found a few chorus frogs each calling at Dave's, Scaphiopus, and Areolatus Ponds. On April 1, 2002, there was a full chorus at Scaphiopus Pond; on April 5, only 1 individual was heard.

Lithobates areolatus (crawfish frog)**.**—In 1964, crawfish frogs were first heard calling at Dave's Pond on March 24 and last heard on April 26 (Rubin 1965a). Eggs were collected in the field on April 2 (ISU 402) and a captive female deposited eggs on March 24 (ISU 403). An individual (ISU 397), completely transformed except for a small tail stub, was taken on June 24, although tadpoles (ISU 398) were still present on June 30. In 1965, the crawfish frog was first heard at Dave's Pond on April 5 (ISU 937). In 1972, Whitaker's herpetology class heard crawfish frogs on March 21 and found individuals at Scaphiopus Pond on April 14, 17, and 21. In 1974, the herpetology class heard crawfish frogs calling at Scaphiopus and Areolatus Ponds from March 4 through April 1. In 2002, Whitaker heard crawfish frogs calling at Scaphiopus Pond on April 1 and estimated the number at 30. On April 5 of that year, he heard a full chorus at Scaphiopus and Areolatus Ponds, and estimated the number at 60.

Voucher specimens of the crawfish frog in the ISU Vertebrate Collection are listed by Engbrecht and Lannoo (2010). These include individuals collected in 1964, 1965, 1969, 1972, and 1974. Most were taken in March and April, but two are from June 1964. Engbrecht and Lannoo (2010) reported the crawfish frog as still being present at Dave's Pond in 2008. Engbrecht et al. (2012) reported seeing it at Dave's Pond in 2009, 2010, and 2011, but estimated the population at only 24 individuals.

Engbrecht and Lannoo (2010) described the status of the crawfish in Indiana, reviewing known records for the frog, including Vigo County. Noting that it had once been described as plentiful, declines had led to its being listed as a state endangered species in 1988. Two years later, an update by Engbrecht et al. (2012) concluded that the crawfish frog had been extirpated north of Vigo County and that Dave's Pond had the only remaining county population and the northernmost extant population in the state.

L. catesbeianus (American bullfrog)**.**—The bullfrog is common at Dave's Pond and widespread in Vigo County. It is the latest of the true frogs to breed, with breeding activity not occurring until summer. Rubin (1965a) noted that he did not hear the bullfrog calling at Dave's Pond in 1964, and July 7 was the last date that year for visitation to the site. Whitaker's herpetology classes regularly visited the site during late winter and early spring of 1972

and 1974 but never recorded bullfrog vocalizations. Tadpoles, however, have been collected there in late winter and early spring, indicating that they overwinter in that stage. A number of adults from Dave's Pond are in the ISU Vertebrate Collection with collection dates ranging from March through May.

L. clamitans (green frog)**.**—The green frog is also common at Dave's Pond and is the next to the latest of the true frogs to breed there. Rubin (1968) noted that the green frog, in Vigo County, calls from late April through June. In 1964, Rubin (1965a) first heard the green frog at Dave's Pond on May 14 and also heard it on July 7, the last day of that year that he visited the site. In 1972, the herpetology class reported calling by the green frog at Scaphiopus Pond on May 16 and 17. Tadpoles taken on March 4, 1965, had either hind legs or developing limb buds, indicating that they had overwintered as tadpoles. Voucher specimens in the ISU Vertebrate Collection from Dave's Pond were collected from March through May.

L. sphenocephalus (southern leopard frog)**.**—The leopard frog is common at Dave's Pond and widespread in Vigo County. Voucher specimens for Dave's Pond in the ISU Vertebrate Collection are from 1964, 1965, 1969, 1972, and 1974. Most of the voucher specimens were collected in March or April. Leopard frogs and wood frogs are the earliest breeding ranids at Dave's Pond, followed by the crawfish frog, with green frog and bullfrog breeding significantly later. In 1964, first and last dates for observed leopard frog breeding activity at Dave's Pond were March 25 and April 26 respectively (Rubin, 1965a). The earliest date in 1965 was March 2. In 1972, Whitaker's herpetology class heard leopard frogs calling at Scaphiopus Pond from April 10 to April 21. In 1974, the herpetology class heard this species calling from March 3 to April 10. In 2002, at Scaphiopus Pond, Whitaker heard a chorus of about 20 individuals on April 1 and a chorus of about 30 individuals on April 5.

L. sylvaticus (wood frog)**.**—In the mid-1960s, the wood frog was the scarcest of the ranids present at Dave's Pond, although it was common at some sites not too distant. In 1964, the wood frog was heard calling at Dave's Pond on April 2 (ISU 489) and eggs (ISU 493) were collected the same day (Rubin, 1965a). Nearby, it had been heard calling as early as March 16. On March 7, 2002, Whitaker heard 2 wood frogs calling just south of Dave's Pond, a few at Scaphiopus Pond, and a chorus of about 20 wood frogs at Areolatus Pond.

Turtles

Chelydra serpentina (snapping turtle)**.**—The snapping turtle is a common county resident, and a usual inhabitant of ponds. Several have been seen in Dave's Pond, usually picked up in seine nets. Voucher specimens from Dave's Pond were taken in April 1964 (ISU 778), March 1965 (ISU 1447), and February 1976 (ISU 3498). An individual found DOR on the Rio Grande Road on April 17, 1972 was not saved.

Chrysemys picta (painted turtle)**.**—Like the snapping turtle, painted turtles frequent county ponds and have been captured in seines at Dave's Pond. Voucher specimens were collected in April, May, and June 1964 (ISU 544, 543, 547); March 1966 (ISU 3499); and April 1974 (ISU 3313). An individual found DOR on the Rio Grande Road (along with the snapping turtle mentioned above) on April 17, 1972 was not saved.

Terrapene carolina (eastern box turtle)**.**—A single specimen was found DOR on the Rio Grande Road in spring 1966. It was not saved.

Snakes

Clonophis kirtlandii (Kirtland's snake)**.**—Kirtland's snake is a species of "Special Concern" in Indiana. This species is known at Dave's Pond from only one specimen taken on 5 May 1966 (ISU 1513) on the Rio Grande Road, between Scaphiopus Pond and Areolatus Pond. The flooded meadows at the Dave's Pond site, along with numerous crayfish burrows with which Kirtland's snake is often associated, provide appropriate habitat for this species. Besides Dave's Pond and Sand Hill, this species is also known in Vigo County from a DOR specimen found in West Terre Haute (Foster, pers. comm. 2004a) and from the Terre Haute Airport where two individuals were taken in late May 2004 (Foster, pers. comm. 2004b).

Nerodia sipedon (common water snake)**.**—The common water snake appears to be found in nearly every stream and pond in Vigo County, and Dave's Pond is no exception. Voucher specimens from Dave's Pond are from April, May, and June 1964 (ISU 707, 719, 726); April 1967 (ISU 1842); and April and May 1972 (ISU 3237, 3418).

Heterodon platirhinos (eastern hog-nosed snake)**.**—A single specimen was found DOR on the Rio Grande Road in spring 1966. It was not saved. Given the sandy soil and the large populations of anurans upon which this species primarily feeds, it was not surprising to find this snake there.

HERPETOLOGICAL COMPARISON OF DAVE'S POND AND SAND HILL

Blatchley (1899) stated that he found 35 species of amphibians and reptiles at Sand Hill. We know many, but not all, of these species. Blatchley (1891, 1899) specifically mentioned spotted salamander, marbled salamander, tiger salamander, newt, slimy salamander, gray treefrog, worm snake (*Carphophis amoenus*), and prairie kingsnake (*Lampropeltis calligaster*) as being taken at Sand Hill. Specimens of others species are still extant in the Museum of Comparative Zoology at Harvard University. We have examined Blatchley's specimens of Jefferson's salamander (MCZ 7067, 7068) and Kirtland's snake (MCZ 14812, 14813) from Sand Hill. Finally, some species can be deduced from Blatchley's comments, from knowledge of the typical habitat in which they are found, and from their abundance in Vigo County.

Blatchley (1899), writing of the salamanders and tree frogs from Sand Hill, stated that "out of 11 species of the former and four of the latter all but two have been seen here, and nine of the 15 nowhere else in the county." To consider only 11 species of salamanders, Blatchley must have omitted the completely aquatic forms, *Necturus* and *Siren*. Blatchley (1891) did record the mudpuppy as common in the Wabash River, and later (Blatchley 1899) recorded a siren from a lowland pond in southern Vigo County. Of the 11 species of salamanders, Blatchley's descriptions preclude his having found the two-lined salamander (*Eurycea cirrigera*) and the long-tailed salamander (*E. longicauda*) at Sand Hill. Blatchley took the two-lined salamander from the Coal Creek area and from a "worn out field, where the soil was wholly clay" and the long-tailed salamander from "beneath rocks in the bed of a branch." Thus, it may be assumed that Blatchley found the following nine salamanders and four tree frogs at Sand Hill: *Ambystoma jeffersonianum*, *A. maculatum*, *A. opacum*, *A. texanum*, *A. tigrinum*, *Notophthalmus viridescens*, *Plethodon cinereus*, *P. glutinosus*, *Hemidactylium scutatum*, *Acris crepitans*, *Hyla chrysoscelis*, *Pseudacris crucifer*, and *P. triseriata*.

Blatchley (1899) stated that the American toad, *Anaxyrus americanus*, was the only toad he found in Vigo County and that it was common. Rubin (1965a), on the other hand, found Fowler's toad (*Anaxyrus fowleri*) at 22 county localities but did not record a single American toad (the American toad has since been recorded for Vigo County, but it is not common). No Vigo County American toads collected by Blatchley are at Harvard, but MCZ 7242, 7243, 7245, and 7247 are Vigo County specimens of Fowler's toad that Blatchley collected. It is thus clear that Blatchley misidentified the toads and that Fowler's toad was common in Vigo County in the 1890s, and it is probable that Blatchley saw this species at Sand Hill.

Six species of true frogs (family Ranidae) were known to occur in Vigo County (seven now as *L. blairi* was found in Vigo County in 2008 (Enbrecht, et al. 2009). We know that Blatchley did not collect *L. areolatus* at Sand Hill. However, he did report *L. areolatus* from Vigo county (Blatchley, 1899): three specimens were collected from two localities–two by C. Stewart in "the south part of the city of Terre Haute" and one by H. McIlroy "three miles west from where the others were secured." Four of the other ranid species (*Lithobates catesbeianus, L. clamitans, L. sphenocephalus*, and *L. sylvaticus*) were reported for Vigo County by both Blatchley (1899) and Rubin (1965a). All four are common and widely distributed in Vigo County, and it is probable that Blatchley saw them at the ponds at Sand Hill. The seventh Vigo County ranid is *Lithobates palustris*, the pickerel frog, which is not common. It is impossible to say whether Blatchley saw this frog at Sand Hill or elsewhere; the same can be said for L. blairi which was not described until 1973.

Based on the comments above, it is likely that Blatchley saw 18 or perhaps 19 species of amphibians at Sand Hill. The remaining 16 or 17 species that he saw at Sand Hill were reptiles. Compared to the amphibians, it is much more difficult to deduce which reptilian species he actually saw there.

We can be fairly certain about seven species of reptiles. From his papers, we know that Blatchley took the worm snake and the prairie kingsnake there, and two of his Sand Hill

specimens of Kirtland's snake are at Harvard. He must also have seen the common water snake, a species ubiquitous in county ponds and streams. He probably also saw snapping turtles and painted turtles; he found both to be common in the county and both are commonly found in small ponds. And he probably found the box turtle at Sand Hill; he said this species was common in "sandy upland woods" such as existed there.

For the remaining 9 or 10 reptiles, of 21 possibilities, it is easier to say what was not found at Sand Hill than what was found. There are five species of turtles that Blatchley definitely did not find at Sand Hill. He found only one specimen of the smooth softshell, in the Wabash River. He reported the map turtle from the Wabash and its larger tributaries. He reported a single specimen of the false map turtle that he found on a road about a half mile from water (presumably the Wabash or some other large stream); two of his specimens of this species at Harvard (MCZ 16470 and 16471) bear the locality data "Wabash River." The only two red-eared turtles he found were at the margin of a pond 5 miles NE of Terre Haute. And he found a single "mud turtle" (presumably a musk turtle – see Rubin 1965a) at a large pond in the southern part of the county. That leaves only one additional species of turtle, the spiny softshell, which he might have found at Sand Hill.

Blatchley did not specify Sand Hill as a locality for skinks but he may very well have seen some there. Blatchley recorded only the five-lined skink (*Plestiodon fasciatus*) for the county, but his descriptions of red-headed adults and a female 10 ½ inches long make it likely that he saw the broad-headed skink (*Plestiodon laticeps*) as well. Both species are possibilities for Sand Hill. With regard to snakes, we know that he did not see the queen snake or the diamond-backed water snake there. The former he found in "rocky branches" and the latter at ponds in the southern part of the county. That leaves, as possibilities, the following snake species: red-bellied (*Storeria occipitomaculata*), DeKay's (*Storeria dekayi*), eastern ribbon (*Thamnophis sauritus*), western ribbon (*T. proximus*), garter (*Thamnophis sirtalis*), black rat (*Elaphe obsolete*), rough green (*Opheodrys aestivus*), racer (*Coluber constrictor*), ringneck (*Diadophis punctatus*), common king (*Lampropeltis getula*), milk, (*L. triangulum*) and hognose (*Heterodon platirhinos*).

Elimination of five species of turtles and two snakes leaves 14 possibilities for the remaining 9 or 10 reptiles. In what is clearly conjecture, but based on Blatchley's comments about abundance and habitat and what we know of distributions in the county, we believe that the remaining 9 or 10 included, in part, DeKay's, garter, black rat, racer, common king, hognose, and at least one of the ribbon snakes, and the skink.

Using this information, Table 1 compares the known herpetofauna of Dave's Pond with the known and probable herpetofauna of Sand Hill. Blatchley's Sand Hill and Dave's Pond both were at the juncture of Illinoian uplands and Wisconsinan lowlands. Both harbor(ed) an extremely large number and variety of species of amphibians and reptiles–35 species at Sand Hill and 21 species at Dave's Pond. At least 18 species, and possibly more, were found at both sites. Most pond-breeding amphibian species were found at both sites. Snakes provide the greatest faunal difference between the two sites.

Both Blatchley and Rubin attributed the herpetofaunal diversity to the fact that the sites lay at upland-lowland junctures, with the mix of upland and lowland conditions providing proper habitat for a wider range of species. Permanent and temporary ponds, along with woods and open fields, exist(ed) at both sites. The sandy soil is ideal for burrowing amphibians, such as the mole salamanders and spadefoot toads, and is preferred substrate for reptiles such as the hog-nosed snake which feed largely on amphibians.

As noted above, Blatchley found 14 more species at Sand Hill than the present authors have found at Dave's Pond. The aquatic and semi-aquatic herpetofauna of the two sites, however, are very similar. The real difference in number of species is due to more terrestrial forms, with Sand Hill having more terrestrial salamanders, such as red-backed and slimy, and many more snakes. This may be due, in part, to the fact that Sand Hill, at 40 acres, was significantly larger than the Dave's Pond site, and probably had much more woodlands. It should also be remembered that it is much easier to overlook animals such as snakes and terrestrial salamanders than it is to overlook species that form large breeding congregations during the appropriate season. The great

majority of visits to the Dave's Pond site took place at night in late winter and early spring when it was much more likely to find amphibians than reptiles. Additional reptiles likely exist in the vicinity of Dave's Pond. For example, because of their abundance in the county and because of the habitat around Dave's Pond, garter snake, racer, and black rat snake would be expected.

STATUS OF DAVE'S POND

Sand Hill, as it was known to Blatchley, is gone; it is too late to save what might have been the most herpetologically diverse site in Indiana. But Dave's Pond remains, and it is not too late to save it. It is still a site of significant herpetological diversity and has added significance because of the populations of crawfish frogs and spadefoot toads that exist there. Several attempts by the authors to have state or private conservation agencies purchase the site have been unsuccessful. Since most of the property changed hands in 2005, researchers have been denied access to Dave's Pond and Scaphiopus Pond, on the north side of the Rio Grande Road. Areolatus Pond, on the south side of the road, continues to be accessible.

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