Burrowing Crayfish of Indiana

Final Report

by

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submitted to

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Management Summary

Crayfish are keystone species in both terrestrial and aquatic invertebrate assemblages. The results of field research reported in this document establish a baseline of information about primary burrowing crayfish in Indiana. This information can be useful for monitoring wetland and lowland habitats of Indiana; for monitoring and behavioral studies of invertebrate and vertebrate species associated with primary burrowing crayfish; and, for evaluating burrowing crayfish as an indicator of anthropogenic disturbance.

The research, conducted over a three-year period, consisted of a **base study**, a **life history/demographics** study, and a **burrow ecology** study. The **base study** was intended to describe the distribution of burrowing crayfish species in Indiana; to determine the relative abundance and density of terrestrial burrowing crayfish; to describe the correlations between burrow habitats with soil and hydrologic parameters; to suggest long-term, statewide monitoring plans (with multiple options for high, medium, and low intensity (cost) efforts; and, to provide an annotated bibliography of scientific literature relative to the distribution, ecology, and life history of Indiana's terrestrial burrowing crayfish and the ecology of their burrows. The **life history/demographics** study of burrowing crayfish attempted to document the sex ratios, growth rate and factors that influence growth, longevity, and other life history parameters. The **burrow ecology** study investigated burrow occupancy; determined the depth, architecture and construction history of burrows; evaluated the size of burrows relative to the size of the occupant crayfish; determined other species found in crayfish burrows; and, determined the persistence of individual burrows and primary burrowing crayfish colonies.

The five species of primary burrowing crayfish (i.e., crayfish that spend almost all of their lives in burrows not associated with surface waters) in Indiana include: Devil Crayfish—*Cambarus* (*Lacunicambarus*) *diogenes*; Ortmann's Mudbug—*Cambarus* (*Cambarus*) *ortmanni;* Painted-hand Mudbug—*Cambarus* (*Tubericamberus*) *polychromatus*; Digger Crayfish—*Fallicambarus* (*Creaserinus*) *fodiens*; and, Prairie Crayfish—*Procambarus* (*Girardiella*) *gracilis*. Four of the five species of primary burrowing crayfish species recorded in this study were widely distributed in Indiana. None of the species are in need of special consideration for their conservation status.

Procambarus gracilis is restricted to the western-most extent of Indiana, representing the eastern edge of its range. *Fallicambarus fodiens* had a small number of records likely due to its restricted habitat preferences. The species is likely more abundant and common than the results indicate. The other three species were commonly encountered and widespread. In general, the five species were only encountered in streams as juveniles dispersing from maternal burrows in early and mid-summer.

The extensive draining and ditching encountered in Indiana does not appear to have greatly reduced the abundance and distribution of Indiana's primary burrowing crayfishes. Many small wetland areas still exist in the State and ditch margins proved suitable as habitat. Surface water quality factors did not affect the presence or absence of burrowing crayfish. Finally, general soil type did not explain or correlate well with primary burrowing crayfish distributions.

Nearly equal sex ratios were found for *C. diogenes*, *C. polychromatus*, and *F. fodiens*. Burrow architecture differed among these three species, with *C. diogenes* having, in general, the most number of entrances and *F. fodiens* the least. *Cambarus polychromatus* is the least likely to have a chimney associated with its burrow, and *F. fodiens* is the most likely. *Cambarus polychromatus* is an active predator with a "wait and pounce" style of predation. *Cambarus diogenes* prefers animal matter to plant material, whereas *F. fodiens* appears to favor plant material. All are facultative consumers.

All species are most active during wet or very humid periods and at night. *Fallicambarus fodiens* plugs its burrow during the early summer, sometimes staying within the burrow until the following spring. This species appears to aestivate, based on its sluggishness when removed from its burrow during the summer. The other two species are active all times of the year except for the coldest periods of winter. All three species appear to migrate from their burrows in the spring for mating and feeding. And, all three species change their burrows from time to time.

Crayfish burrows harbor a wide variety of invertebrates, with microcrustaceans having the greatest diversity and numbers. None of the taxa identified in this study were deemed "burrow-obligates." Seasonal and latitudinal differences in organisms associated with primary crayfish burrows were absent or very weak. No listed species of vertebrates were observed to reside in primary crayfish burrows during this study.

Recommendations (from high intensity to low intensity) for future monitoring work with primary burrowing crayfish center on re-examination of 100%, 50%, or 25% of all sites evaluated during this study once each decade. A targeted study should be carried out to further define the role of soil type, looking at individual soil parameters instead of the more generic soil type categorization. Finally, a second targeted study is suggested that concentrates on vertebrate co-inhabitants of burrows, and that employs the burrow scope used to good effect in this study.

Table of Contents

Acknowledgements

We would like to thank the Indiana Department of Natural Resources, Division of Fish and Wildlife, Wildlife Diversity Section and its Chief for their vision, encouragement, and support in funding this project. We thank Ohio University, ILGARD in Athens, Ohio for the assistance of Roger F. Thoma, the principal investigator on this project. The Aquatic Research Center (ARC) of the Indiana Biological Survey is acknowledged for their assistance as a subcontractor for portions of the Base Study and the Life History units of this project. To numerous Indiana University undergraduate students and other volunteers who worked tirelessly to assist with the fieldwork, we extend our grateful thanks. And finally, to all others who worked on this project or who provided data or assistance in any form, we are most appreciative.

Introduction

Crayfish are keystone species in both terrestrial and aquatic invertebrate assemblages. Lorman and Magnuson (1978) conclude crayfish can strongly influence the flow of energy in aquatic ecosystems. Hobbs III (1993) and DiStifano (2005) concluded crayfish perform important roles as predators, processors of vegetation and carrion and are an important prey item for species above them. Momont (1995) stated crayfish can comprise greater than 50% of all macroinvertebrate biomass. Butcher *et al*. (2003) found that crayfish structured both the invertebrate and benthic fish assemblages of streams in the Northern Lakes and Forest Ecoregion of Minnesota, Wisconsin, and Michigan. The presence of crayfish explained about 90 percent of the variation in the invertebrate assemblage.

Almost all crayfish can produce a burrow. However, primary burrowing crayfish are noted for producing complex or elaborate burrows in which they spend most of their lives. These burrows are not normally connected to permanent water bodies. Primary burrowing crayfish emerge from their burrows to mate or to forage for food. Usually these forays occur during periods of rainfall or high humidity in order to keep their gills moist. Plugs for the burrows are often added by primary burrowing crayfish for protection, or during periods of molting or aestivation (Hobbs, Jr. 1981).

Taylor et. al (2007) reported five primary burrowing species from Indiana based on Eberly 1955, Page and Mottesi 1995, and Simon 2001. These burrowing species create elaborate excavations (Page 1985; Jezerinac *et al*. 1995; Pflieger 1996; Hobbs, Jr. 1981; Thoma and Jezerinac 2000), which are used by a variety of rare, endangered, and unidentified species associates that either share a commensal, parasitic, or predatory existence within crayfish burrows. Rare species using crayfish burrows for portions of their life history include the Hine's Emerald Dragonfly (*Somatochlora hineana*), Crawfish Frog (*Rana reolatacirculosa*), Copperbelly Water Snake (*Nerodia erythrogaster neglecta*), and Eastern Massasauga Rattlesnake (*Rana areolatacirculosa*).

The purpose of the work reported herein is to accumulate information about the five species of primary burrowing crayfish that occur in Indiana. The work was divided into three tasks, including a general survey, assessment of life history, and an investigation of burrow ecology. This information can then be used as a baseline for evaluating the use of terrestrial burrowing crayfish as keystone species for monitoring habitat changes and anthropogenic disturbances; for future studies of primary burrowing crayfish and other species that use their burrows; and, for future surveys and inventories of these interesting taxa.

Study Approach

This study was divided into three tasks, as follows:

Task 1. Base Study
Objectives: The primary burrowing crayfish species that occur within the state include: Digger Crayfish—*Fallicambarus* (*Creaserinus*) *fodiens;* Prairie Crayfish—*Procambarus* (*Girardiella*) *gracilis*; Devil Crayfish—*Cambarus* (*Lacunicambarus*) *diogenes;* Paintedhand Mudbug—*Cambarus* (*Tubericamberus*) *polychromatus*; and Ortmann's Mudbug—*Cambarus* (*Cambarus*) *ortmanni*. The primary objectives of the base study are:

1. Describe the distribution of primary burrowing crayfish species in Indiana;
2. Determine the relative abundance and density of terrestrial burrowing crayfish;
3. Describe the correlations between burrow habitats with soil and hydrologic parameters;
4. Suggest long-term, statewide monitoring plans (with multi-options for high, medium, and low cost with associated advantages); and,
5. Provide an annotated bibliography of scientific literature relative to the distribution, ecology, and life history of Indiana's terrestrial burrowing crayfish and the ecology of their burrows.

Task 2. Demographics/Life History
Objectives: The demographics associated study of burrowing crayfish will document the following:

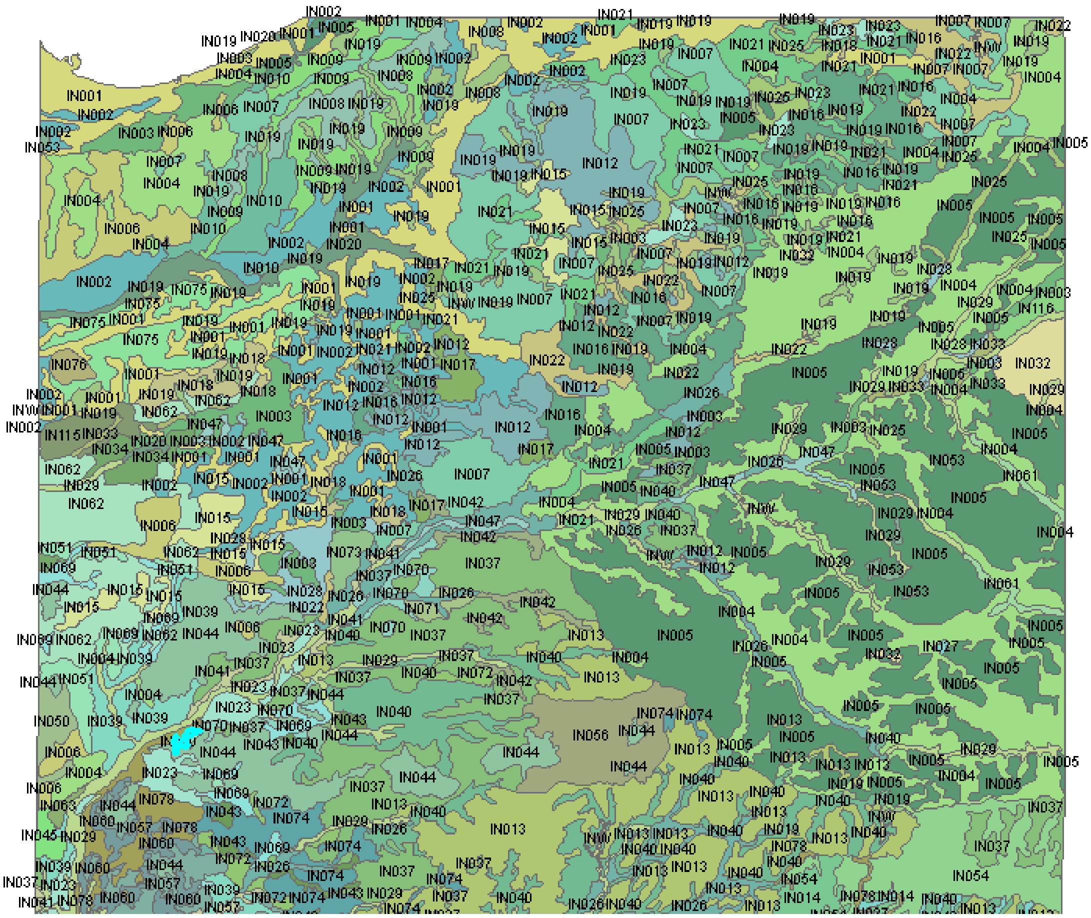
1. Sex ratios;
2. Growth rate and factors that influence growth rate; and,
3. Longevity.

Task 3. Burrow Ecology
Objectives: Primary objectives of the burrow ecology associated study are as follows:

1. Burrow occupation history (an example is burrows vacant at a certain time of year or for long periods of time);
2. Depth, architecture and construction history of the burrow;
3. Burrow size relative to size of occupant;
4. Other species found in crayfish burrows/season; and,
5. Persistence of individual burrows and terrestrial burrowing crayfish colonies.

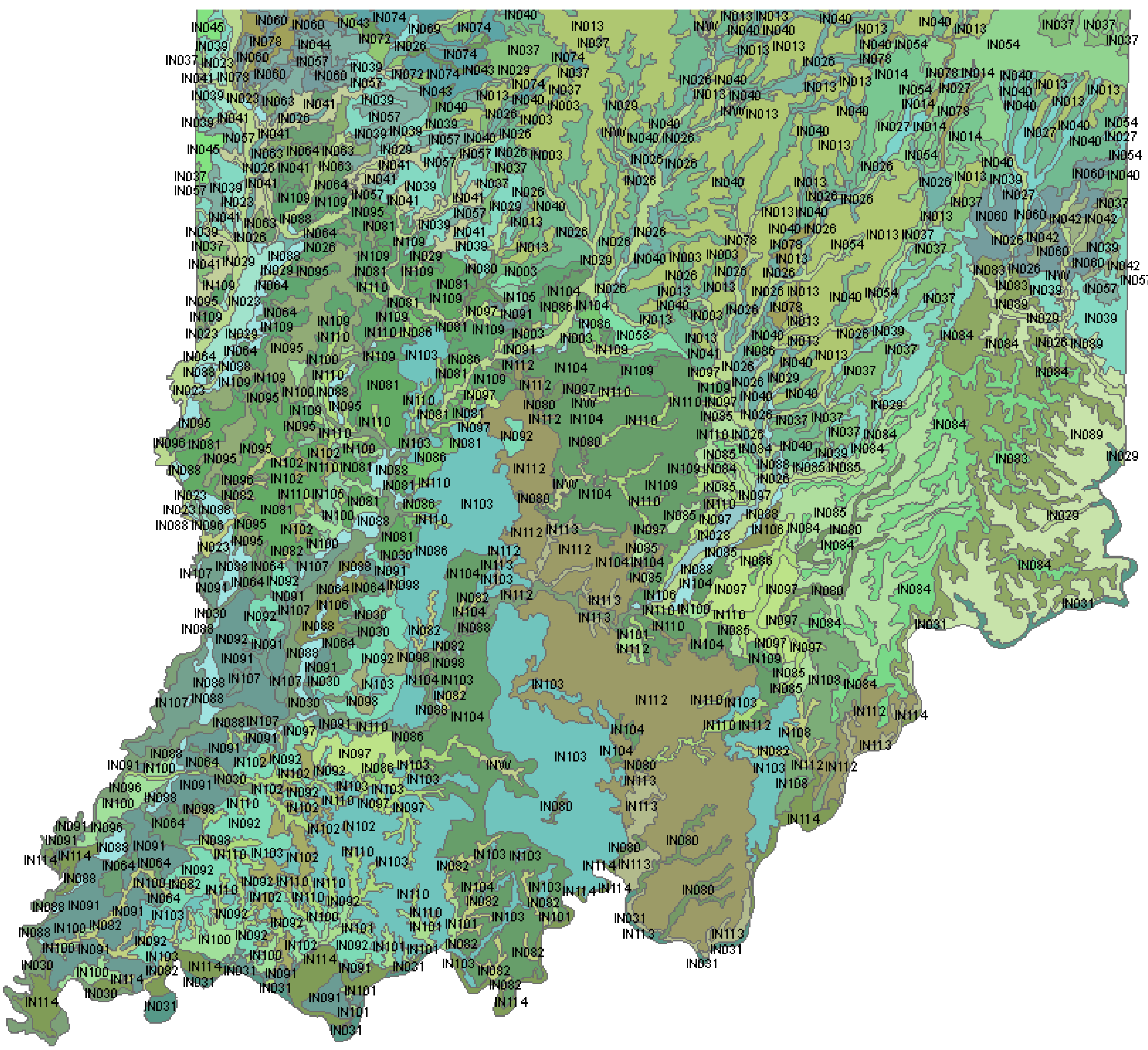
Burrows vs. Indiana Soil Types

Reference Map 1. One of the variables that was initially thought to be important in the distribution and population density of primary burrowing crayfish is soil type. The following is a map of Indiana soil types for reference with maps in those in the Task 1 section of the report, as well as Appendix 1 Tables 1-6. The map of Indiana has been split into two parts in order to increase size and legibility. An overlap zone has been retained for each map in the middle of Indiana.



IN001	Coloma-Spinks-Oshtemo
IN002	Gilford-Maumee-Sparta
IN003	Rensselaer-Darroch-Whitaker
IN004	Blount-Glynwood-Morley
IN005	Blount-Pewamo-Glynwood
IN006	Morley-Markham-Ashkum
IN007	Riddles-Crosier-Oshtemo
IN008	Coupee-Elston-Tracy
IN009	Tracy-Chelsea-Tyner
IN010	Bourbon-Sebewa-Pinhook
IN012	Crosier-Brookston-Barry
IN013	Crosby-Treaty-Miami
IN014	Crosby-Cyclone-Miamian
IN015	Wolcott-Odell-Corwin
IN016	Miami-Wawasee-Crosier
IN017	Metea-Markton-Crosier
IN018	Rensselaer-Aubbeenaubbee-Markton
IN019	Houghton-Adrian-Carlisle
IN020	Craigmile-Suman-Prochaska
IN021	Oshtemo-Kalamazoo-Houghton
IN022	Spinks-Houghton-Boyer
IN023	Elston-Warsaw-Shipshe
IN025	Sebewa-Gilford-Homer
IN026	Fox-Ockley-Westland
IN027	Eldean-Ockley-Sleeth
IN028	Martinsville-Whitaker-Rensselaer
IN029	Sawmill-Lawson-Genesee
IN030	Nolin-Haymond-Petrolia
IN031	Huntington-Newark-Woodmere
IN032	Hoytville-Nappanee-Blount
IN033	Montgomery-Strole-Lenawee
IN034	Swygert-Bryce-Chatsworth
IN037	Fincastle-Brookston-Miamian
IN039	Miami-Miamian-Xenia
IN040	Miami-Crosby-Treaty
IN041	Miami-Strawn-Hennepin
IN042	Russell-Miami-Xenia
IN043	Fincastle-Miami-Crosby
IN044	Drummer-Toronto-Wingate
IN045	Ipava-Sable-Tama
IN047	Millsdale-Newglarus-Randolph
IN050	Elliott-Ashkum-Varna
IN051	Barce-Montmorenci-Drummer
IN053	Milford-Martinton-Del Rey
IN054	Miamian-Celina-Crosby
IN056	Patton-Del Rey-Crosby
IN057	Reesville-Fincastle-Ragsdale
IN058	Miami-Fincastle-Xenia
IN060	Russell-Hennepin-Xenia
IN061	Saranac-Eel-Tice

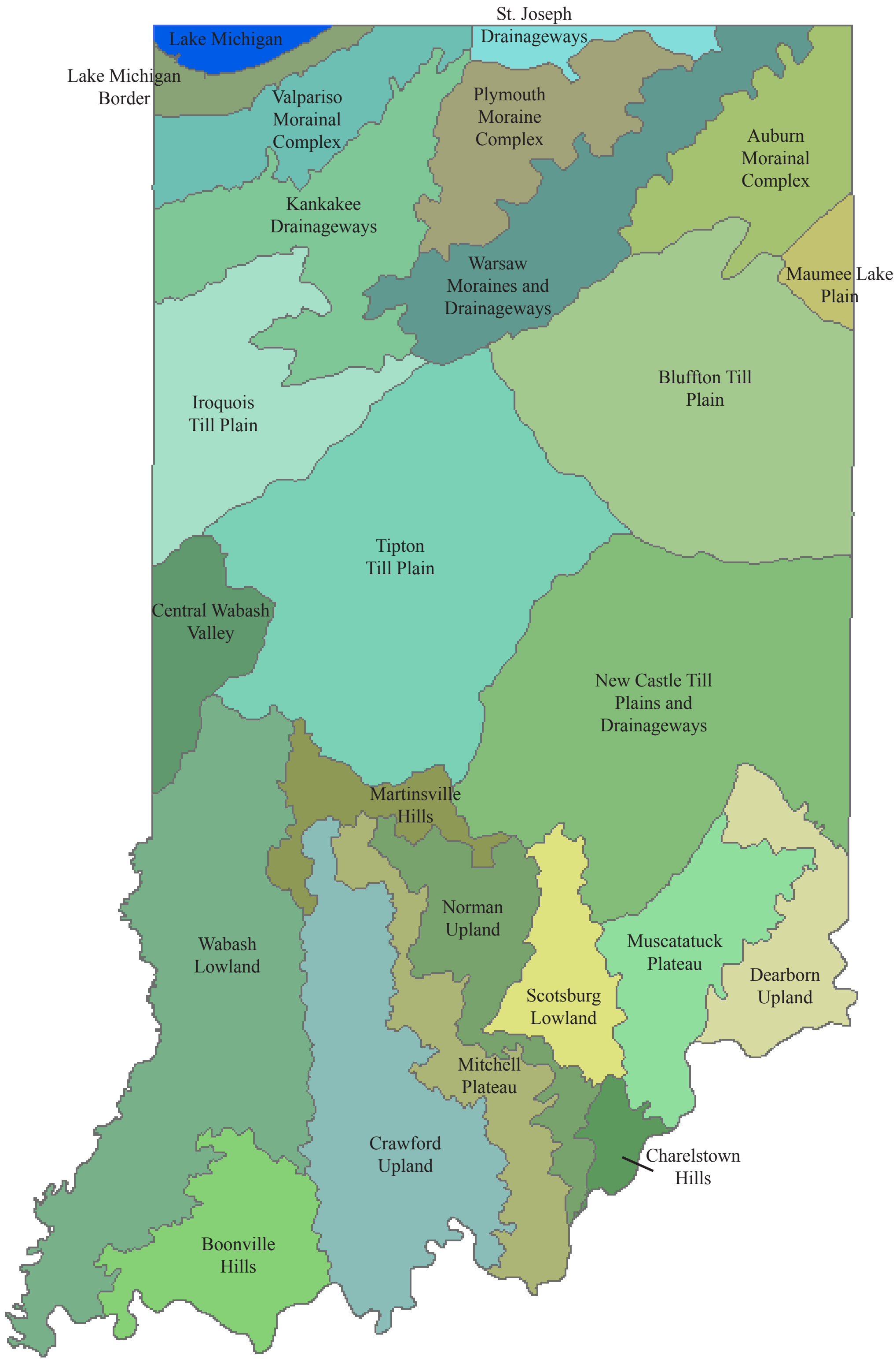
IN062	Saybrook-Drummer-Parr
IN063	Russell-Alford-Reesville
IN064	Reesville-Ragsdale-Uniontown
IN069	Warsaw-Lorenzo-Dakota
IN070	Rockfield-Fincastle-Camden
IN071	Patton-Starks-Kendall
IN072	Martinsville-Ockley-Starks
IN073	Mahalasville-Waynetown-Sleeth
IN074	Mahalasville-Starks-Camden
IN075	Granby-Zadog-Maumee
IN076	Kentland-Conrad-Zaborosky
IN078	Westland-Sleeth-Ockley
IN080	Haymond-Wakeland-Pekin
IN081	Ava-Cincinnati-Alford
IN082	Wakeland-Haymond-Wilbur
IN083	Cincinnati-Bonnell-Rossmoyne
IN084	Cobbsfork-Avonburg-Rossmoyne
IN085	Cincinnati-Rossmoyne-Hickory
IN086	Negley-Parke-Chetwynd
IN088	Bloomfield-Princeton-Ayrshire
IN089	Eden-Switzerland-Edenton
IN091	Alford-Sylvan-Iona
IN092	Hosmer-Zanesville-Stendal
IN095	Hosmer-Stoy-Hickory
IN096	Lyles-Patton-Henshaw
IN097	Dubois-Otwell-Peoga
IN098	Peoga-Bartle-Hosmer
IN100	Zipp-Vincennes-Evansville
IN101	Markland-Uniontown-Mcgary
IN102	Fairpoint-Bethesda-Zanesville
IN103	Zanesville-Wellston-Gilpin
IN104	Wellston-Berks-Gilpin
IN105	Vigo-Shakamak-Ava
IN106	Lyles-Ayrshire-Bloomfield
IN107	Selma-Armiesburg-Vincennes
IN108	Cincinnati-Trappist-Jennings
IN109	Hickory-Cincinnati-Berks
IN110	Stendal-Bonnie-Birds
IN112	Crider-Baxter-Bedford
IN113	Corydon-Caneyville-Gilpin
IN114	Wheeling-Elkinsville-Vincennes
IN115	Barry-Sumava-Octagon
IN116	Latty-Fulton-Nappanee



Introduction

Reference Map 2. Indiana Natural Regions, labelled at the Section level.

Reference Map 3. Indiana Physriographic Regions.



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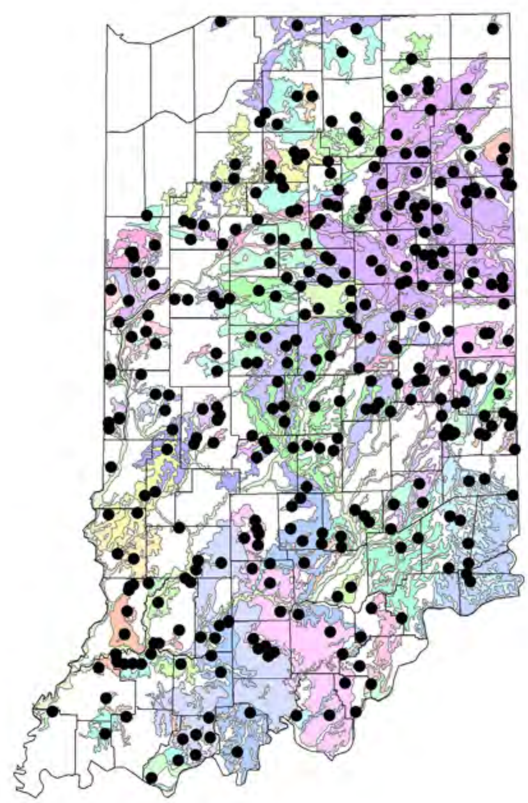
Task 1

Base Study



Approximately half of the field work and all analyses and reporting for this section was performed by the Midwest Biodiversity Institute, Columbus, Ohio. Approximately half of the field work was completed by the Aquatic Research Center of the Indiana Biological Survey.

Base Study—Task 1

Introduction

Crayfish have been collected, studied, and used for bait in Indiana for over 100 years. Hay (1896) presented the first list of crayfish for Indiana. However, the first meaningful summary of crayfish distribution information was done by Eberly (1955). Hobbs (1989) identified 17 species of crayfish known from Indiana, including four of the five known Indiana species of primary burrowing crayfish. More recently, Simon (2001) listed 22 species from the State.

A primary burrowing crayfish is a species whose life history includes spending significant periods in a burrow that is not usually connected to surface waters (e.g., streams or lakes). Mating often occurs outside of the burrows during spring flood periods.

Five species of primary burrowing crayfish are known to inhabit Indiana, and are discussed in this section. The species are *Cambarus polychromatus*, *Cambarus diogenes*, *Cambarus ortmanni*, *Fallicambarus fodiens*, and *Procambarus gracilis*. *Cambarus polychromatus* and *Cambarus diogenes* are widely distributed in Indiana. *Procambarus gracilis* is confined to a narrow band of 6 counties adjacent the western edge of Indiana. *Fallicambarus fodiens* is found throughout Indiana, but only in or near specific habitat types. *Cambarus ortmanni* has a distribution focused on west central counties of the State. Each species' distribution and the factors associated with it are discussed below.

Methods

Site selection: The 644 sites (Fig. 1) sampled for the base study portion of the study were all randomly selected. No stratified sampling effort was made. Random site selections were made by developing random number tables (using Microsoft Excel) that produced sets of decimal degree latitude and longitude data for each individual county. Random sites were plotted using TopoUSA software. The first 6 sites that fell within the specific county's boundaries and within 500 meters of a mapped water-body were selected for sampling.

Field sampling: Each selected site, when visited for sampling, was first surveyed to determine that an actual water-body or crayfish burrows were present. If not, a new site was selected from the random numbers table as described above. If a water-body or crayfish burrows were present, the site was then investigated to find the area with the highest density of crayfish burrows. Ten active burrows, when available, were then investigated for crayfish occupants.

The method employed to examine each individual burrow was to first excavate an area at the mouth that would allow one to capture any crayfish that might come to the burrow entrance. This was done either by hand or with a small shovel, depending on soil hardness. Once the area was prepared the burrow was filled with water to the point that a small pool was formed in the entrance area sufficient to harbor the potential resident crayfish. The burrow was then pumped either by hand (exclusively at 578 sites) or with a toilet plunger (66 sites only). After pumping, the burrow was then observed for five minutes to see if a crayfish would come to the surface of the water. If a crayfish appeared, the collector would attempt to catch it. If a crayfish did not appear, or if a crayfish appeared and was not captured, the burrow was pumped and observed again. This procedure was continued until a crayfish was captured or the collector was satisfied that no crayfish was in residence. Occasionally a burrow was further excavated, which frequently increased the probability of seeing a resident crayfish.

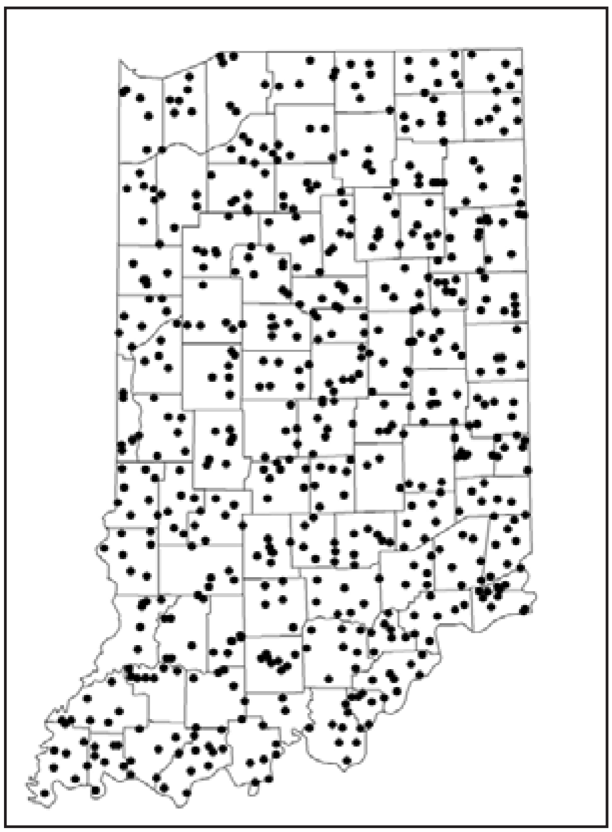


Figure A-1. Distribution of sites sampled during the Base Study portion of the Indiana burrowing crayfish project.

Plate I. Range of primary burrowing crayfish habitats. A. highly disturbed, roadside ditch habitat; B. recovering ditch and swale area; C. burrows in plowed cornfield; D. *Fallicambarus fodiens* in wet woodland habitat; E. *Cambarus polychromatus* colony in mature, wooded kettle hole; F. *Cambarus ortmani* slough adjacent to river.

Plate II. Primary burrowing crayfish. A. *Cambarus diogenes* at mouth of burrow. B. closed burrow of *Fallicambarus fodiens* during midsummer. C. *Cambarus polychromatus* (left) and *C. diogenes* (right). D. *Fallicambarus fodiens*. E. *Cambarus ortmani*. F. *Procambarus gracilis*.

After collecting from crayfish burrows, any nearby surface water (permanent or intermittent) was examined with a seine, backpack electroshocker, dip nets, or hand for burrowing crayfish that might be found in the habitat. Depending on the habitat type, different techniques were employed. In lotic waters kick seining was used. In kick seining a 4ft. X 6ft. seine or dip net was placed downstream of the person(s) sampling and the substrate was disturbed by kicking with the feet and flipping rocks or woody debris. Any disturbed crayfish would then wash into the seine or dip net with the current. This technique was also used to sample along stream banks, especially where undercut banks exist. Again the seine or dip net is placed downstream and the feet were used to kick under the bank and drive crayfish into the seine along with the current. Dip nets were also used with the bank jab technique in which the dip net is shoved under and into the bank and then lifted from the water catching any crayfish that might be hiding there. In lentic habitats, the seine is actively dragged through the water to collect any crayfish in the area. Hand searching was used in both lentic and lotic habitats to collect crayfish on the surface. When crayfish were observed on the surface (either in the water or out) they were simply picked up by hand and added to the collection. Large rocks and woody debris also were lifted to search for hiding crayfish and any observed crayfish were captured by hand. The INBS-ARC crews occasionally used an electrofishing unit to sample lentic and lotic habitats. This was a more passive method in which an electrical current was applied to the water. This caused any crayfish present to swim from and/or with the stimulus. Dip nets or a 4X6' seine was then used to capture the swimming crayfish. When surface waters were sampled, an effort was made to sample an area of water equivalent to 10 times the wetted width if possible. This normally resulted in a sample length of 50 to 100 meters especially in small streams and ditches.

All crayfish captured were collected, recorded, preserved, and identified by the principle investigator except for the material collected by INBS-ARC during the 2006 field season.

Habitat assessment: Each site was assessed using the QHEI habitat assessment methodology developed by the Ohio Environmental Protection Agency (Rankin 1995).

Mapping: Crayfish distributions were plotted using the ArcGIS 9 program. Soil layers used in analysis were obtained from the Indiana Department of Agriculture.

Multivariate analysis: The StatSoft Statistica Version 8 program was used to perform all statistical and multivariate analysis.

Results

Cambarus polychromatus: Thoma *et al.* 2006 reported this species from Michigan, Ohio, Indiana, Illinois, Kentucky, and Tennessee. It is a primary burrowing species with a wide range of environmental tolerance. Found at 349 sites or 78.6% of all base study sites (Fig. A-2) this was the most commonly encountered species in the state. Only the most northwestern counties did not have the species present. It may be that the species is not able to cross the Kankakee Outwash Plain. Fig. A-2 displays the soil layers associated with the collec-tion sites. Sixty-six (97.1%) of the 68 soil types cataloged for Indiana were occupied by the species. The species showed no preference for a specific habitat type. Wetlands, rivers, streams, springs, lake and pond edges, and ditches were all occupied. It was found in similar abundance in both disturbed and natural habitats as long as water was near enough the surface. It was normally the only burrowing species encountered in recently dredged or cleaned ditches.

Cambarus diogenes: This is one of the most wide spread crayfish species in North America (Hobbs, Jr. 1989). Whereas not the most frequently encountered in Indiana, it was the most wide spread, being found at 176 sites (41.9%) in all corners of the State (Fig. A-3). Not all counties were found to harbor the species but it is likely that a more thorough search would find it. It was found on 48 soil types (70.6%). Habitat preferences were similar to *Cambarus polychromatus*, which was found at 60.2% of all sites where *Cambarus diogenes* was recorded. *Cambarus diogenes* was rarely found in recently disturbed habitats though.

Fallicambarus fodiens: Though *Fallicambarus fodiens* was found to be wide spread in Indiana, it was only recorded at 18 sites (Fig. A-4). Nine soil types were associated with it. The limited number of records appears to be a consequence of the habitat preferences exhibited by the species. Nine of the 18 records were of a single individual or a body part. The species was intolerant of habitat disturbance. The healthiest or most abundant populations were found in wooded wetland areas. Very few such areas were sampled during this study because of the sample site selection methodology and the extensive ditching and draining of wetlands in Indiana. It is likely that sampling targeted on wooded wetlands would record the species in almost all Indiana counties. Of the four primary burrowers monitored in this study Fallicambarus fodiens was most likely to be found in burrows without water.

Procambarus gracilis: This species is known from western Indiana (Fig. A-5), through most of Illinois, southeast Wisconsin, parts of Iowa, Missouri, Nebraska, Kansas and Oklahoma. (Hobbs,Jr 1989,

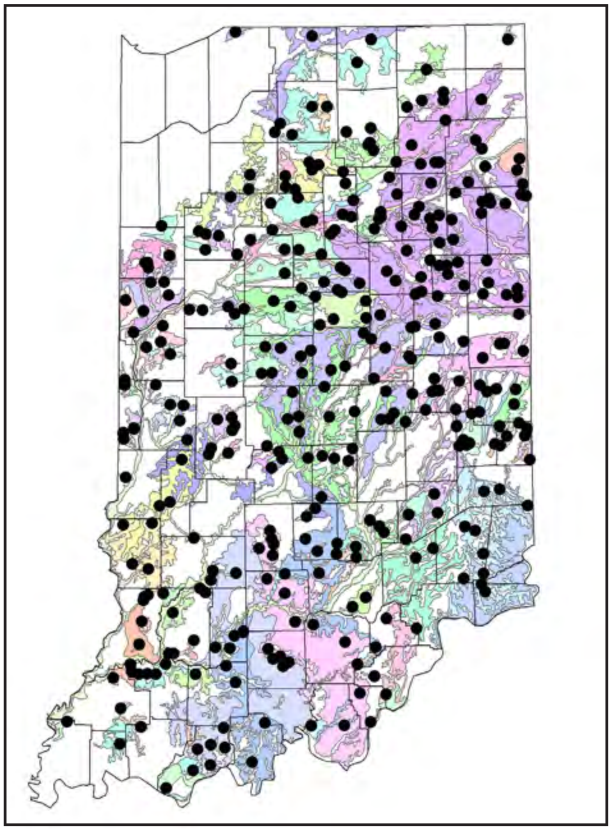


Figure A-2. Distribution of *Cambarus polychromatus* in Indiana with associated soil layers in color.

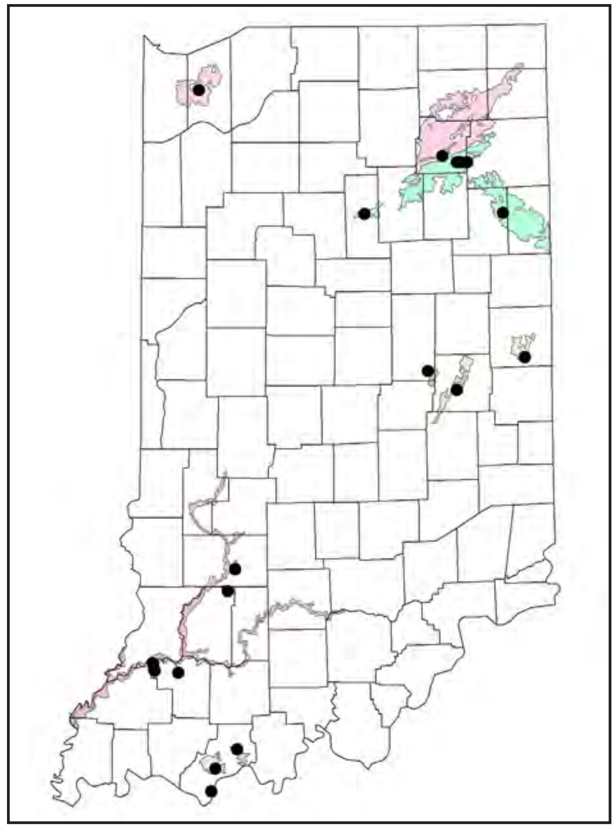


Figure A-4. Distribution of *Fallicambarus fodiens* in Indiana with associated soil layers in color.

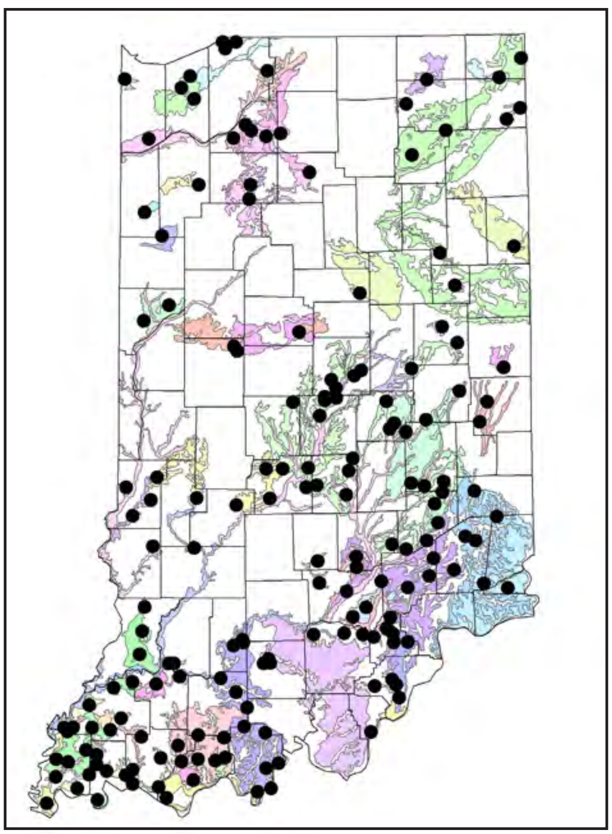


Figure A-3. Distribution of *Cambarus diogenes* in Indiana with associated soil layers in color.

Hobbs III 1988, Pfleiger 1996, and Page 1985). It is a species of historic prairie habitat (Page 1985, Pleiger 1996). In Indiana it was found in both wooded and old prairie habitats. Only ten collections were made during this study and seven soil types were found to be associated with Procambarus gracilis. It is the most geographically restricted burrowing crayfish species in the State.

Cambarus ortmanni: From the distribution map of this species, it appears a postglacial dispersal into Indiana from the western edge of the Ohio area via the Wabash River occurred. It was the third most frequently encountered burrowing species in the study (85 sites). Twenty soil types were associated with the species (Fig. A-6). The species was usually associated with streams and ditches. It was rarely found far from such habitat. Populations in channelized streams and ditches were frequently the most abundant.

The previous 4 species usually burrowed vertically and frequently up to 2 meters. *Cambarus ortmanni* rarely burrowed vertically, preferring to burrow into stream banks at an angle starting just above the normal summer water level. If burrowing vertically, it would not normally burrow more that one-meter. The population in northwest Indiana's Lake County may be an outlier

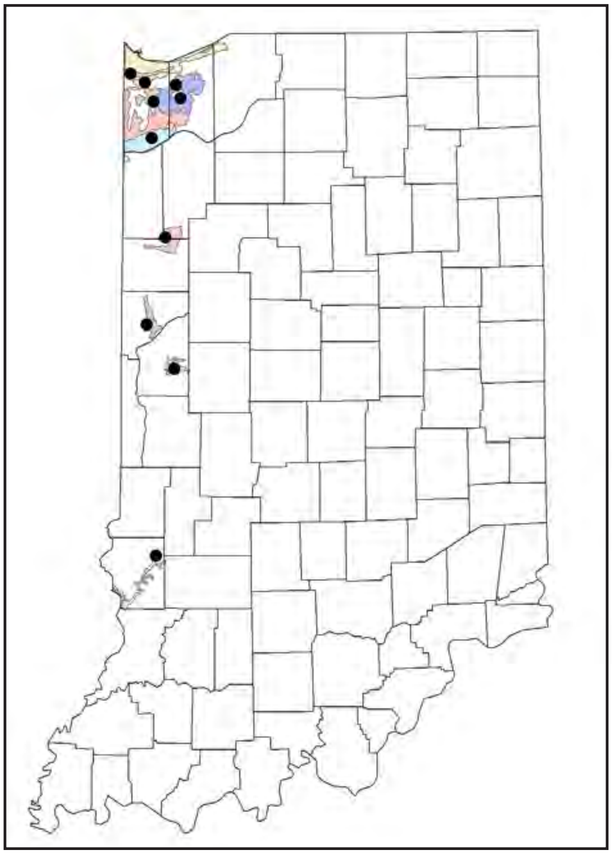


Figure A-5. Distribution of *Procambarus gracilis* in Indiana with associated soil layers in color.

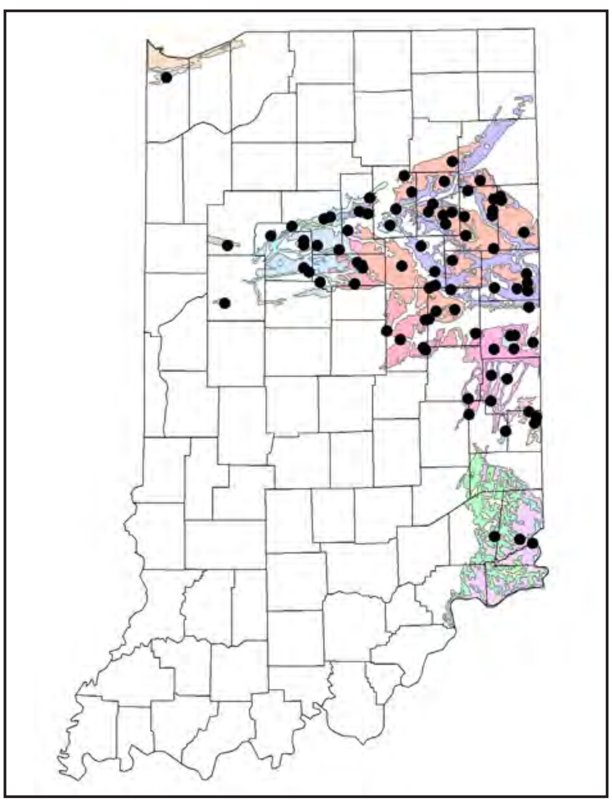


Figure A-6. Distribution of *Cambarus ortmanni* in Indiana with associated soil layers in color.

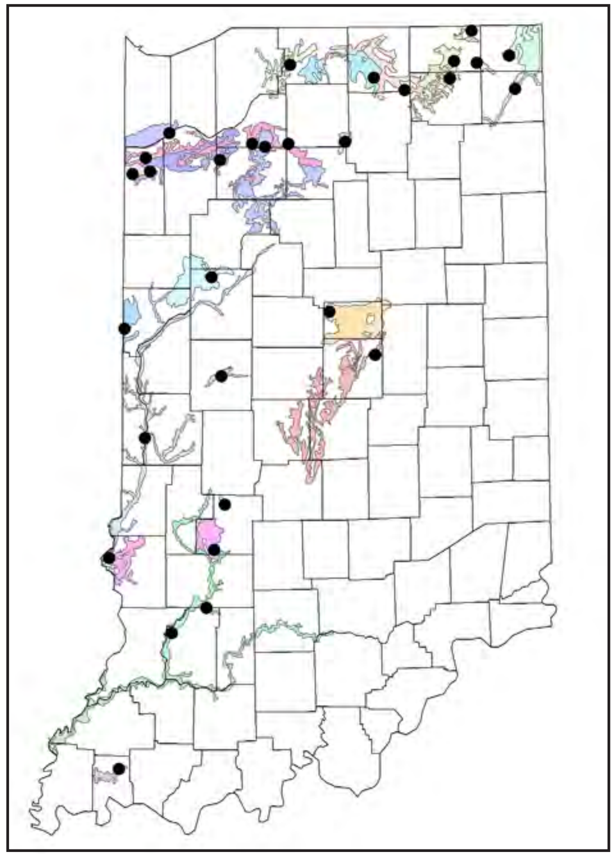


Figure A-7. Distribution of sites lacking burrowing crayfish in Indiana with associated soil layers in color.

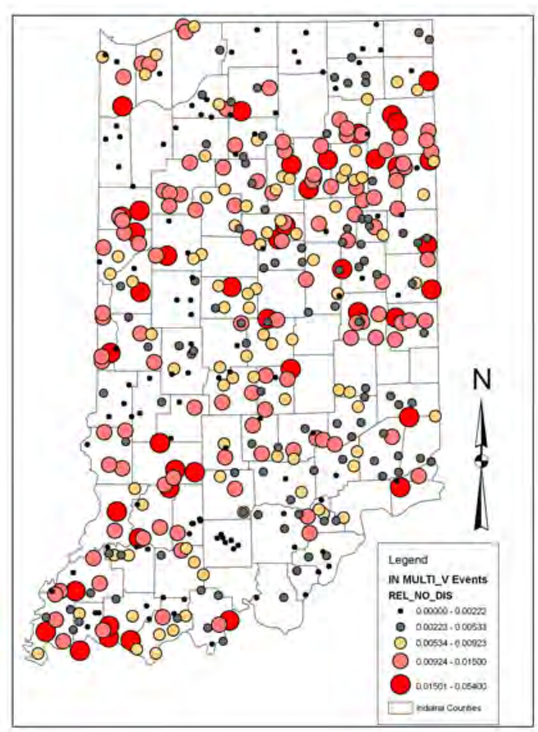


Figure A-8. Relative abundance of burrowing crayfish in Indiana. Point size represents the number of all primary burrowing crayfish species by meter.

or there may be an undiscovered population connection in the Jasper county area.

No Crayfish Encountered: Thirty sites were found to have no crayfish in their adjacent water body or any crayfish burrows (Fig. A-7). These sites were found on 21 soil types. All but two soil types had one or more primary burrower crayfish associated with them at some site in Indiana. The two soils that did not have any primary burrower species associated with them were the Granby-Zadog-Maumee (MUID IN75) and Kentland-Conrad-Zaborosky (MUID IN76) soils. The Kentland-Conrad-Zaborosky soils had only the one sample site located on it. The Granby-Zadog-Maumee soils had one other site located on it and that site had a population of Orconectes immunis at it. From this example it is apparent that soil types do not explain burrowing crayfish distributions. Observations in the field indicated two factors that influenced the absence of burrowing crayfish, high concentrations of sand and limestone bedrock near the surface.

Relative abundance

Relative abundance (Fig A-8) of burrowers shows a pattern of lower numbers in areas of limestone bedrock (southern and southeastern Indiana) and in a band of outwash gravels and sands in northwest Indiana known as the Kankakee Outwash Plain (Camp and Richardson 1999). As stated above, habitats with tendencies to have high sand concentrations or limestone near the surface tended to have fewer burrowing crayfish. In part, this is one of the reasons for the north-south difference in relative abundance.

Multivariate assessment of soil/habitat/crayfish relationships

Three types of multivariate analysis [cluster analysis (Figs. A-9 and A-10), principle component analysis (Fig. A-11), and factor analysis (Fig. A-12)] were employed to assess the relationship between burrowing crayfish presence/abundance and two factors, habitat quality and soil type. All three analytical methodologies failed to show a significant relationship between burrowing crayfish and their surrounding environs.

Cluster Analysis—Soil type was such a variable factor,

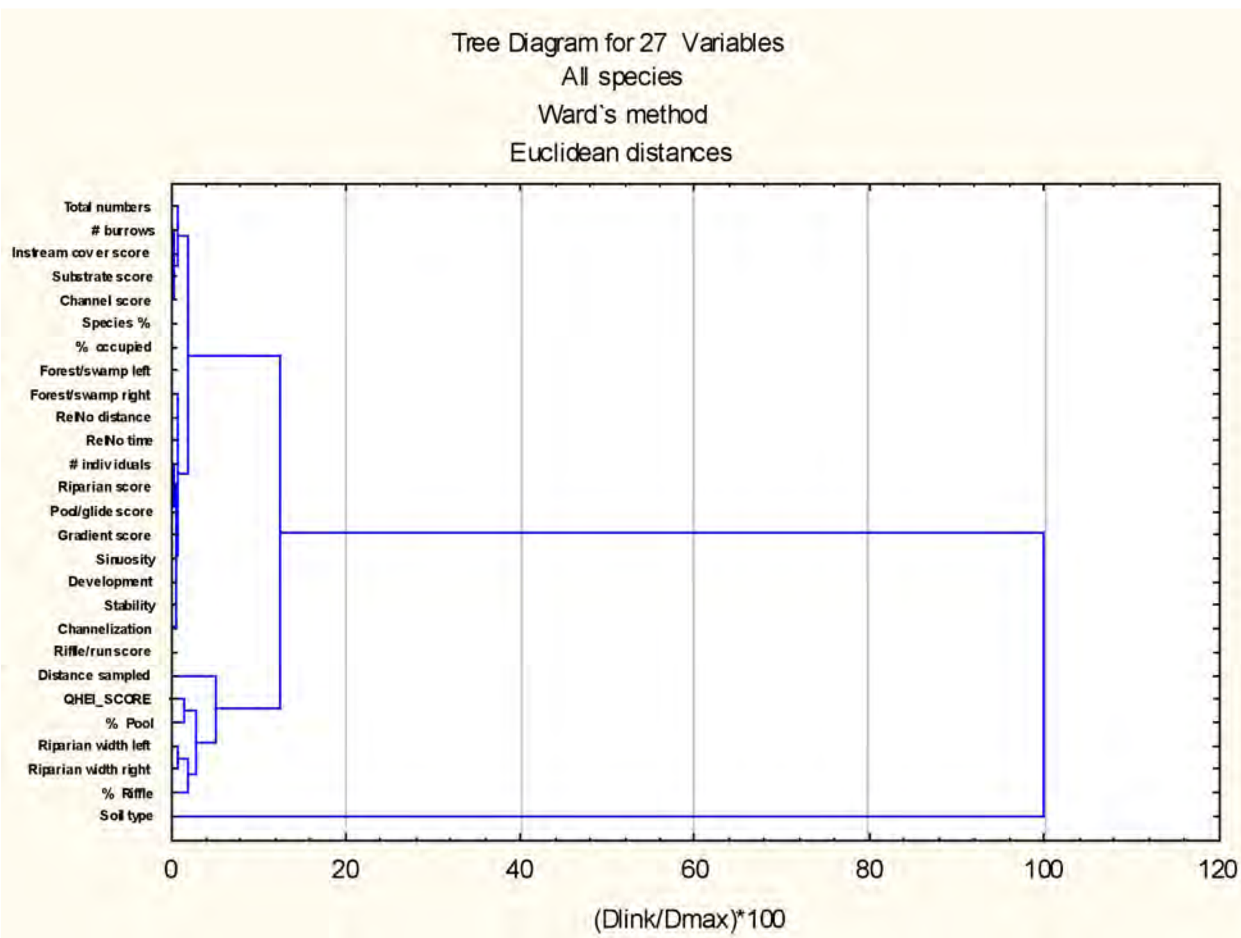


Figure A-9. Cluster analysis of 27 variables (Y axis) including soil type. Methodology used was Ward's method using Euclidian distance and graphed using (Dlink/Dmax)*100.

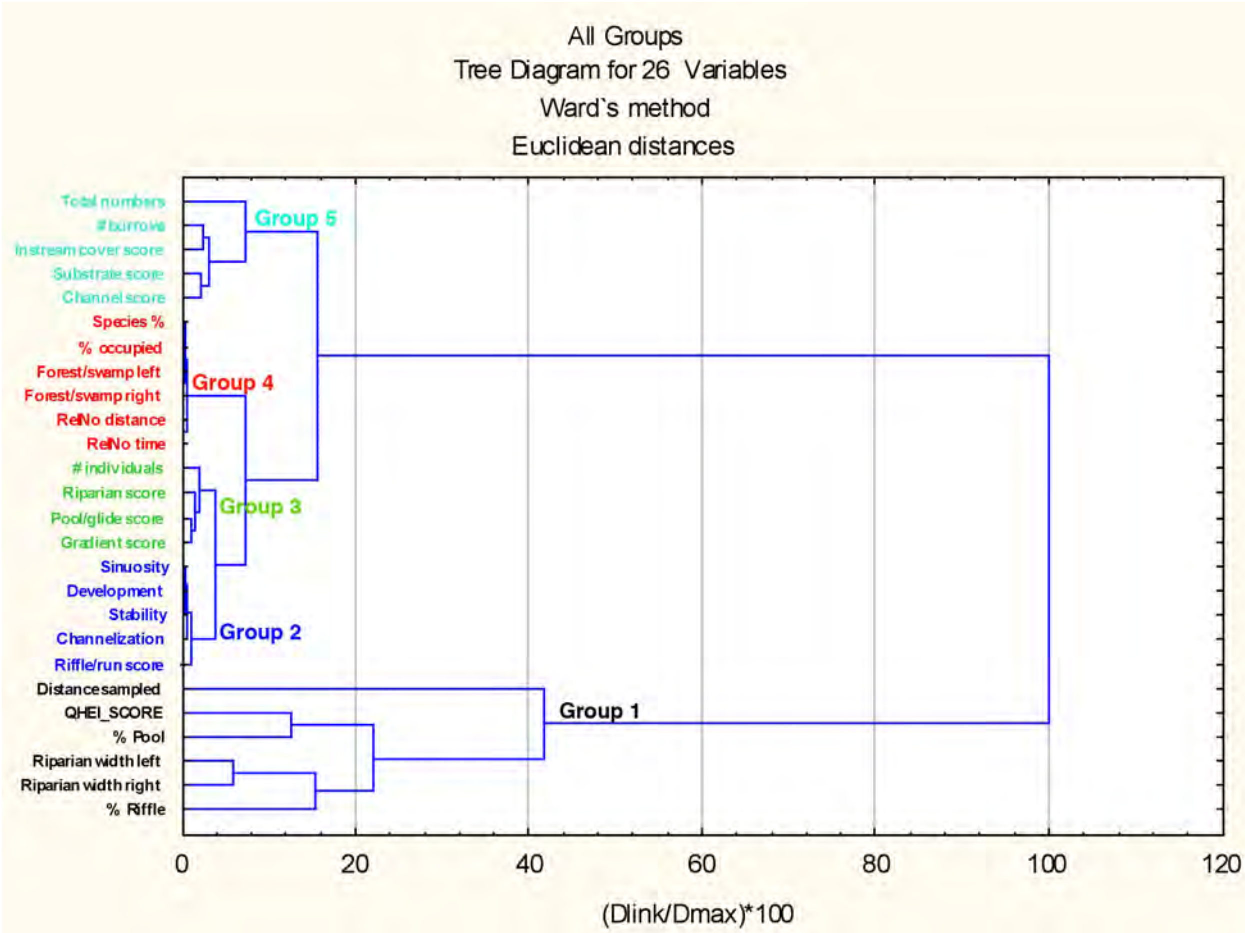


Figure A-10. Cluster analysis of 26 variables (Y axis) without soil type for all groups. Methodology used was Ward's method using Euclidian distance and graphed using (Dlink/Dmax)*100. Five variable groups are defined and associated variables color coded.

that its inclusion in cluster analyses obscured the relationships among all the other variables. Fig. A-9 illustrates the results achieved for analysis of all sites, whether burrowing species were present or not, and the habitat values derived for the QHEI at those sites. Soil type did not closely relate to any of the other 26 variables analyzed. Fig. A-10 illustrates an analysis with all species and without soil type included . This analysis is used as the baseline for the discussion of each subset of sites analyzed by species.

Five basic groupings of variables were found in the base analysis (Fig. A-10). Each grouping was assigned a number and color-coded to facilitate interpretation. Group 1 is comprised of six variables (total QHEI score, riparian width left and right, distance sampled, and riffle and pool composition percentage). Groups 2 through 5 are much less well defined, and should not be recognized individually, but will be discussed here and later. Group 2 is comprised of the four channel morphology individual metrics and the riffle/run metric score. Interestingly, the channel morphology metric score clustered in Group 5. Group 3 has three of the seven individual metric scores (gradient, pool/glide, and riparian) plus the total number of individuals for each burrowing crayfish species. Group 4 is four abundance measures and forested riparian (flood plain) left and right. Group 5 is substrate score, instream cover score, and channel score grouped with the number of burrows examined and the total number of burrowing crayfish captured. Each individual species was then assessed using the same approach as discussed in the previous paragraph.

***Analyses of individual species*:** The groupings for individual species (not shown) followed almost exactly the same groupings as those for the All Groups analysis (Fig. A-10). As would be expected, species found in the largest number of sites (e.g., *C. polychromatus* and *C. diogenes*) had the most influence on the All Groups results and showed the least departure. The remaining three species, less widely distributed, showed some variation versus the All Groups results. However, these variations were not significant, and probably reflected the lower number of data points that were recorded for

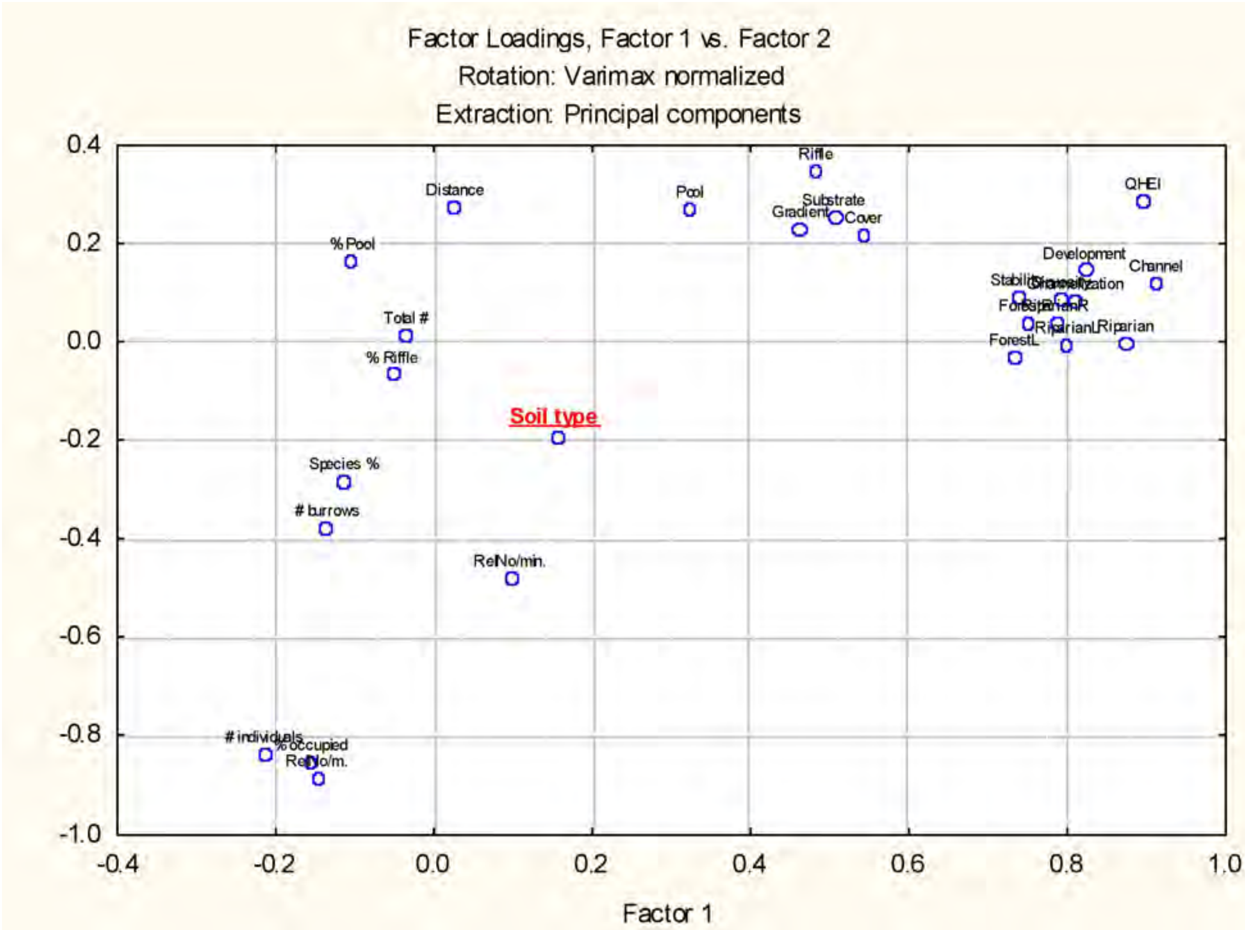


Figure A-11. Principle component analysis. Plot of Factor 1 and 2 with varimax normalization.

them.

No burrowers or No crayfish: In the assessment of sites with either no burrowing crayfish or no crayfish at all, there was considerable differences compared to the All Groups results. For non-burrower sites, the separation of the variables was smaller than in the All Groups analysis, indicating less patterning and more randomness in the habitats found at these sites. For no-crayfish sites, the cluster analysis was not very informative, did not provide ecological insights, and showed little discriminatory power.

Principle Component Analysis—It is clear when examining the results of the principle components analysis why the previous analyses gave such poor results. First, Factor 1 explains only 34% of the variance observed in the data. The less variance explained by a factor the less reliable the results are and 34% is considered to be low. Second, the closer a variable lies to the centroid of a plot the less variation it explains. Variables grouping together in a plot are closely related to each other.

In the lower left quadrate of Fig. A-11 are clustered the variables related to crayfish abun-dance while on the right central portion of the graph are clustered the habitat variables. If habitat was exerting an influence on burrowing crayfish abun-dance the two subsets of data would be more inter-mingled in the plot of the results. Soil type is so near the centroid of the plot one can only conclude that it has no influence on the other variables of the analysis.

Factor Analysis—Factor analysis yields similar results (Fig. A-12) to those derived from the principle component analysis discussed above. Soil types is once again found to be isolated from the other variables. Abundance measures of burrowing crayfish are clustered on the left side of the graph and all but two habitat variables are clustered separately from crayfish abundance in the upper right. The two exceptions are % pool and %riffle. These two habitat variables were seen to cluster

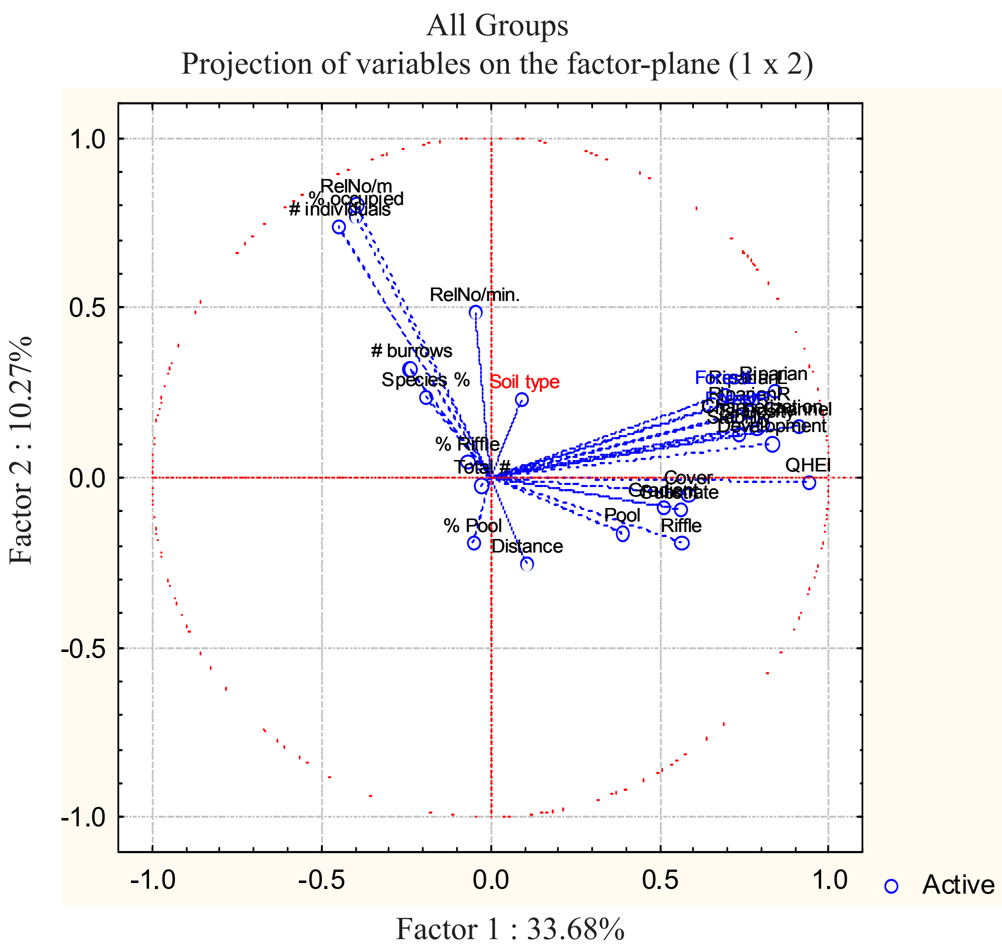


Figure A-12. Factor analysis. Plot of Factor 1 vs. Factor 2 (~33.7% vs. ~10.3% of the variation observed in the dataset).

most closely and consistently with Group 1 in the cluster analysis results. In the principle component results they were found to be close to the centroid and thus lacked explanatory potential.

Base Study Conclusions

Four of the five species of primary burrowing crayfish species recorded in this study were widely distributed in Indiana. None of the species are in need of special consideration for their conservation status. *Procambarus gracilis* is restricted to the western-most extent of Indiana, representing the eastern edge of its range. *Fallicambarus fodiens* had a small number of records likely due to its restricted habitat preferences. The species is likely more abundant and common than the results indicate. The other three species were commonly encountered and widespread.

In general, the five species were only encountered in streams as juveniles dispersing from maternal burrows in early and mid-summer. Adults were, on rare occasion encountered in streams. It is thought these individuals could have been on some form of mating expedition.

Another phenomenon observed in the field (no data recorded) was associated with crayfish size. The larger an individual was, the more likely it was to be found farther from the local water body and the deeper its burrow might be. First year, independent individuals were never found far from the water body's edge or the water table. This is not to say that large individuals were not found near water body edges, as they frequently were, but that they were more likely to be found farther from water than smaller individuals.

The extensive draining and ditching encountered in Indiana does not appear to have greatly reduced the abundance and distribution of Indiana's primary burrowing crayfishes, as many small wetland areas still exist in the State and ditch margins proved suitable as habitat. Surface water quality factors did not affect the presence or absence of burrowing crayfish. Burrowing crayfish only rarely have contact with surface waters.

Soil types did not explain or correlate well with primary burrowing crayfish distributions, while factors such as site-specific high sand concentrations, limestone bedrock near the surface (resulting in thin soil layers), and proximity of water tables did. It is likely that the broad scale soil layer information used in this study was too coarse to provide meaningful information for the explanation of crayfish distribution and abundance recorded in this study. Small-scale variations in soil composition, resulting in localized lenses of site-specific soil types (e.g., higher clay content areas in a sand dominated soil type or high sand content in clay dominated soils) can have a strong effect on crayfish presence and abundance. Habitat factors did show some weak associations with crayfish abundance.

The three multivariate analyses confirmed our field observations concerning the lack of a relationship between soil types and and habitat quality with primary burrowing crayfish presence and/or abundance. If data was available on site-specific soil parameters, rather than simply soil type designations, these analyses might prove valuable in further delineating primary burrowing crayfish habitat requirements.

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Task 2

Life History

Field work and some analyses for this section were performed by the Aquatic Research Center of the Indiana Biological Survey, Bloomington, IN. This section was edited and species accounts added by Roger F. Thoma [RFT] for the Midwest Biodiversity Institute, Columbus, Ohio.

Life History—Task 2

Introduction

The crayfish family Cambaridae includes over 360 described species in Canada and the USA (Taylor *et al.* 2007). Forty-eight percent of these crayfish are imperiled, with 11 species known only from a single site (Taylor *et al.* 2007). Basic life history information is lacking for almost 60% of the crayfish species (Taylor *et al.* 2007), and many species require taxonomic resolution (Crandall & Fitzpatrick 1996; Sinclair *et al.* 2004). Crayfish are among the most imperiled faunal groups in the United States, second only to the freshwater mussels in percent endangered taxa. However, only four crayfish species have been provided federal protection, partly due to lack of basic information about population dynamics, geographic boundaries, and life history.

Hobbs (1981) described primary burrowing crayfish as species that were primarily burrow inhabitants. Some life history information, specifically pertaining to sex ratios, is available for all of Indiana's primary burrowing crayfish. Thoma *et al.* (2005) reported that sex ratios were slightly skewed in favor of females for *C. polychromatus*. Norrocky (1991) reported a nearly equivalent male to female sex ratio for *Fallicambarus fodiens* during a study in northeastern Ohio. *Procambarus gracilis* has limited information from Illinois (Page 1985) and Wisconsin (Jaas & Hobbs 1988), with populations exhibiting a nearly equal male to female ratio.

Burrow characteristics have been studied for *Cambarus diogenes* and *Fallicambarus fodiens*, particularly in relation to habitat and physical features of the burrows. *Cambarus diogenes* was found to burrow mostly in clay and silty-clay soils, with chimneys reaching up to 30 cm high (Ortmann 1906, and Grow & Merchant 1980). Grow & Merchant (1980) also concluded that the amounts of oxygen in the water of the burrows were not sufficient to sustain crayfish even for short periods of time, and they suspected that crayfish must obtain oxygen from the air in the burrow rather than from the water. They also found that *C. diogenes* spent most of the time in the burrows at the air/water interface in laboratory experiments, suggesting that crayfish remain moist from the nearby water and can directly absorb oxygen by diffusion into their gills from the surrounding air.

The purpose of the current study is to document basic demographic information for selected crayfish species, including sex ratios, relationships between individual carapace sizes and burrow diameter, burrow fidelity, and longevity. *Cambarus polychromatus* (Jezerinac 1993, Taylor & Schuster 2004, Thoma *et al.* 2005) is endemic to Indiana, Illinois, Ohio, Kentucky, Michigan, and Tennessee. *Cambarus diogenes* is currently a species complex (Hobbs, Jr. 1981). *Cambarus diogenes* is endemic to the Great Lakes basin from Ontario, Pennsylvania, Ohio, Michigan west to Wisconsin and Minnesota and from Indiana, Illinois, Kentucky, Tennessee to Missouri, Arkansas, Oklahoma, Iowa to Colorado, Kansas, Nebraska, South Dakota, and Texas and on the east coast from Georgia to Maryland on the Piedmont and Coastal Plain (Pflieger 1987, Jezerinac 1993, Hobbs, Jr. 1981). *Fallicambarus fodiens* (Cottle 1863) is a wide-ranging species, found throughout the southeastern and midwestern United States and east coast from South Carolina to Maryland on the Piedmont and coastal plain (Hobbs 1981, Page 1985, Pflieger 1987, Jaas & Hobbs 1988, Page & Mottesi 1995, Taylor & Schuster 2004). This demographics study is the first to document life history attributes for two these species.

Methods

Objective: The primary objective was to describe the sex ratios, burrow characteristics, and longevity of selected primary burrowing crayfish species to contribute much needed basic information about life histories.

Study Species: Species selected for this study included the Digger Crayfish *Fallicambarus fodiens*, Devil Crayfish *C. diogenes* and the Painted-hand Mudbug *Cambarus polychromatus*.

Study Sites: This study was conducted in tributaries of the White River, in Monroe and Owen Counties, Indiana. Three sites representing a variety of habitat types (natural forested, disturbed, and channelized stream reaches) were selected for the study. The core site was the West Fork of Jackson Creek, downstream of the Rogers Road bridge, about 2.5 mi SE Bloomington, Perry Township, Monroe County (Plate I). The Jackson Creek site is a tributary of the East Fork White River. The two satellite sites were located in the Plummer Creek drainage, Owen County, Indiana. One satellite site included Plummer Creek, about 1.5 mi SSE Bloomfield (Plate II), while the second satellite site included a drainage ditch and adjacent farm field about 0.1 mi N of Plummer Creek. The Jackson Creek site is a typical riffle, run, pool stream, which occurs in the Eastern Corn Belt Plain and is about 5.3 m wide. Jackson Creek is a slab, cobble, rock bottom stream with forested riparian corridors. The sampling zone also includes a small spring (<.0.5 m wide) that originates in an adjacent Sherwood Oak park and flows

Plate I. Jackson Creek, Monroe County, downstream Rogers Road bridge: top left – upstream Rogers Road bridge, middle left – downstream Rogers Road bridge, bottom left– Jackson Creek adjacent farm, top right – headwater spring upstream, middle right- headwater spring downstream, and bottom right – Jackson Creek at walkbridge.

Plate II. Plummer Creek, Greene County: top right – fallow farm field northern, top left—fallow farm field southern section, middle – roadside ditch, bottom left – Plummer Creek upstream county road bridge, and bottom right – Plummer Creek downstream county road bridge.

Plate III. Bean Blossom Bottom, Monroe County: top left – central portion of The Nature Conservancy property showing restored farm field, middle left – western edge of TNC property adjacent Bean Blossom Creek, bottom left – mowed edge along road, top right – Bean Blossom Creek upstream County Road, middle right – Bean Blossom Creek ca 100 m upstream County Road, and bottom right – Bean Blossom Creek ca 200 m upstream County Road.

into Jackson Creek. A third life history site included Bean Blossom Bottom, which is about 4.5 mi N Bloomington, Monroe County (Plate III). Bean Blossom Bottom is a natural area owned by The Nature Conservancy and borders the creek. It comprises a large wetland that is part of a restored farm field. The site included three burrowing species including *C. polychromatus, C. diogenes,* and *Fallicambarus fodiens*. The wetland was the primary core site, while the stream and adjacent road were the two satellite sites.

Sampling Period: Sampling was conducted from May 2004 until February 2006.

Specimen Collection: Burrows were fitted with Norrocky traps (Norrocky 1984), which were inserted at the entrance of each burrow and were checked the following day. A Norrocky trap consists of a piece of PVC pipe about 2" in diameter and 1' long. A sheet metal hinge flap is secured inside the pipe at an angle, such that a primary burrowing crayfish entering the trap can not back out. For each captured individual, species and sex of the individual along with diameter measurements of the burrow openings were noted. Crayfish were also measured for postorbital carapace length (POCL; Jezerinac 1993) to determine the relationship between individual crayfish size and burrow size for each species.

Burrow Fidelity: Trapped individuals were measured for carapace postorbital ridge length, burrows with crayfish present were flagged, and these crayfish individuals were placed back in their burrows immediately. Over the course of six weeks, traps were placed repeatedly overnight at the flagged burrows. Carapace lengths were used to determine the identity of the individual crayfish to monitor how long crayfish individuals remain with their burrows.

Longevity: Estimated ages of the five burrowing species were based on estimation of growth using a length-frequency distribution histogram for each species.

Results

Sex Ratios:
Sex ratios were determined for three burrowing crayfish (Appendix 2). A total of 19 collections of *Fallicambarus fodiens* included 18 males and 20 females, resulting in a sex ratio of 47% male and 53% female for the species. A total of 306 collections of *Cambarus polychromatus* revealed a sex ratio of 48% male and 52% female from 838 adult specimens. A total of 47 collections of *Cambarus diogenes* included 70 males and 71 females, resulting in a 50% male and 50% female sex ratio. County sex ratio records for the five burrowing species are included in the Appendix.

Burrow Fidelity:
Cambarus polychromatus were originally trapped from 60 burrows that were flagged for monitoring on 2 July 2004–4 July 2004 (Table B-1). These 60 burrows were then set with overnight traps and checked a total of nine times through 8 August 2004. During that period, four more crayfish appeared in the burrow traps, totaling 64 crayfish during this study. Crayfish ranged in size from 16mm postorbital carapace length (POCL) to 60mm in burrows that ranged from 10mm to 56mm in diameter of the opening. During the 10 sampling nights of the 60 burrows, crayfish were trapped in 184 of the 600 traps, resulting in a 30% success rate. The original occupants of the burrows were replaced on 17 occasions, of which seven new occupants were larger than the previous occupants (Table B-2). Therefore, 41% of the new occupants were larger and 59% of the new occupants of the burrows were smaller. There was a maximum of three different occupants for one burrow over the 41-day sampling period. Four individuals probably stayed in the same burrow throughout the entire sampling period, as they were captured at the beginning and end of the study.

Cambarus polychromatus individuals were trapped more often at larger burrows (>45mm) than at smaller burrows (<45mm) (Fig. B-1). POCL was correlated with burrow diameter, with larger individuals occupying larger burrows (n = 38 individuals) (Fig. B-3). This trend appeared to be similar between females (n = 13 individuals) and males (n = 25 individuals).

Cambarus diogenes were originally trapped from 30 burrows which were flagged for monitoring on 2 July 2005 – 3 July 2005 (Table B-3; Fig.B-2). These 30 burrows were then set up with overnight traps and checked for a total of nine more times through 10 August 2005. During that period, four more crayfish appeared in the burrow traps, totaling 34 crayfish during this study. Crayfish ranged in size from 18mm to 50mm POCL in burrows that ranged from 16mm to 58 mm in diameter (Fig. B-4). During the 10 sampling nights, crayfish were trapped in 130 of the 300 traps, resulting in a 43% success rate. The original occupants of the burrows were replaced on 10 occasions, of which eight new occupants were larger than the previous occupants (Table B-4). Therefore, 80% of the new occupants were larger and 20% of the new occupants of the burrows were smaller. There was a maximum of two different occupants for one burrow over the 39 day sampling period. One individual probably stayed in the same burrow throughout the duration of the study.

Table B-1. Size of individual *Cambarus polychromatus* trapped by date including burrow number assignment, burrow diameter (mm), and postorbital carapace length (POCL; mm).

Cambarus polychromatus		Size of Individual Trapped											
Burrow Number	Burrow Diameter (mm)	7/2/2004	7/3/2004	7/4/2004	7/16/2004	7/18/2004	7/23/2004	7/25/2004	7/30/2004	8/3/2004	8/5/2004	8/10/2004	8/12/2004
1	18	23	.	.	23	.	.	.	.	.	.	.	.
2	25	27	.	.	25	.	.	.	.	.	.	.	.
3	38	45	.	.	38	.	.	.	.	.	.	.	.
4	45	59	.	.	59	59	59	.	.	59	.	.	59
5	38	45	.	.	45	45	.	.	.	.	.	.	.
6	50	47	.	.	47	47	47	47	47	47	.	.	.
7	21	33	.	.	33	.	.	.	.	.	.	.	.
8	21	34	.	.	34	.	.	.	.	.	.	.	.
9	20	34	.	.	34	.	.	.	.	.	.	.	.
10	25	37	.	.	37	.	.	.	.	.	.	.	.
11	38	54	.	.	54	.	54	.	.	.	54	.	54
12	41	46	.	.	46	46	.	46	.	.	.	.	.
13	15	18	.	.	.	.	.	.	.	.	.	.	.
14	16	20	.	.	20	20	20	20	20	20	.	.	.
15	16	22	.	.	.	.	.	.	.	.	.	.	.
16	19	23	.	.	23	23	23	.	.	.	.	.	.
17	19	23	.	.	19	.	.	.	.	.	.	.	.
18	20	25	.	.	20	.	.	.	.	.	.	.	.
19	10	.	17	.	17	17	17	.	.	.	.	.	.
20	35	.	45	.	35	.	.	.	.	.	.	.	.
21	30	.	34	.	34	34	34	34	.	34	.	.	.
22	35	.	37	.	35	.	.	.	.	.	.	.	.
23	45	.	48	.	48	48	48	48	48	.	.	.	.
24	45	.	45	.	45	45	45	.	.	.	.	.	.
25	30	.	34	.	34	.	.	.	.	.	.	.	.
26	30	.	33	.	33	.	.	.	.	.	.	.	.
27	25	.	38	.	39	.	.	.	.	.	.	.	.
28	36	.	45	.	49	.	.	.	.	.	.	.	.
29	45	.	54	.	54	54	54	54	.	.	.	.	.
30	56	.	60	.	60	60	60	.	.	.	.	.	60
31	42	.	51	.	42	.	.	.	.	.	.	.	.
32	43	.	50	.	50	.	.	.	.	.	.	.	.
33	45	.	48	.	48	48	48	48	.	.	.	.	.
34	45	.	49	.	49	49	49	49	.	.	.	.	.
35	50	.	56	.	56	.	.	.	.	.	.	.	.
36	34	.	43	.	43	.	.	.	.	.	.	.	.
37	30	.	42	.	42	42	.	42	.	.	.	.	.
38	29	.	41	.	41	.	.	.	.	.	.	.	.
39	16	.	22	.	28	.	.	.	.	.	.	.	.
40	15	.	21	.	28	.	33	33	.	.	33	.	33
41	21	.	34	.	26	.	.	.	.	.	.	.	.
42	22	.	33	.	48	48	48	.	.	.	.	.	.
43	18	.	23	.	28	.	.	.	.	.	.	.	.
44	18	.	.	22	18	.	.	.	.	.	.	.	.
45	15	.	.	16	15	.	.	.	.	.	.	.	.
46	15	.	.	18	.	.	18	.	.	.	.	.	.
47	20	.	.	22	.	.	.	.	.	.	.	.	.
48	25	.	.	23	23	.	.	.	.	.	.	.	.
49	24	.	.	23	23	.	.	.	.	.	.	.	.
50	34	.	.	31	31	.	31	.	.	.	.	.	.
51	38	.	.	45	45	.	.	.	.	.	.	.	.
52	38	.	.	47	47	.	.	.	.	.	.	.	.
53	40	.	.	48	48	.	.	.	.	.	.	.	.
54	34	.	.	45	45	.	.	.	.	.	.	.	.
55	25	.	.	28	.	.	.	.	.	.	.	.	.
56	25	.	.	31	39	.	.	.	.	.	.	.	.
57	49	.	.	60	60	60	60	60	60	60	60	60	60
58	34	.	.	45	42	.	.	.	.	.	.	.	.
59	16	.	.	18	18	.	.	.	.	.	.	.	.
60	16	.	.	19	19	19	.	.	.	.	19	19	.

Table B-2. *Cambarus polychromatus* burrow fidelity based on burrow number assignment including days with same individual, occupied trap dates, number of different individuals, and qualitative assessment of individual size replacement.

Cambarus polychromatus

Burrow Number	Days with Same Individual	Days With Occupied Traps	Number of Different Individuals	Size of Replacing Individual
1	14	2	1	.
2	.	.	2	smaller
3	.	.	2	smaller
4	41	6	1	.
5	14	3	1	.
6	32	7	1	.
7	14	2	1	.
8	14	2	1	.
9	14	2	1	.
10	14	2	1	.
11	41	5	1	.
12	23	4	1	.
13	.	.	1	.
14	32	7	1	.
15	.	.	1	.
16	21	4	1	.
17	.	.	2	smaller
18	.	.	2	smaller
19	20	4	1	.
20	.	.	2	smaller
21	31	6	1	.
22	.	.	2	smaller
23	28	6	1	.
24	20	4	1	.
25	13	2	1	.
26	13	2	1	.
27	13	2	1	.
28	.	.	2	larger
29	22	5	1	.
30	40	5	1	.
31	.	.	2	smaller
32	13	2	1	.
33	22	5	1	.
34	22	5	1	.
35	13	2	1	.
36	13	2	1	.
37	22	4	1	.
38	13	2	1	.
39	.	.	2	larger
40	20	4	3	larger and larger
41	.	.	2	smaller
42	7	3	2	larger
43	.	.	2	larger
44	.	.	2	smaller
45	.	.	1	.
46	19	2	1	.
47		.	1	.
48	12	2	1	.
49	12	2	1	.
50	19	3	1	.
51	12	2	1	.
52	12	2	1	.
53	12	2	1	.
54	12	2	1	.
55	.	.	1	.
56	.	.	2	larger
57	39	10	1	.
58	.	.	2	smaller
59	12	2	1	.
60	37	5	1	.

Cambarus diogenes individuals were trapped more often at larger burrows (>50mm) than smaller burrows (<50mm). POCL was correlated with burrow diameter, with larger individuals occupying larger burrows (n = 52 individuals). This trend was similar between females (n = 33 individuals) and males (n = 19 individuals).

Fallicambarus fodiens individuals (n = 71) were also trapped and the POCL was measured for all individuals. There was also a correlation with burrow diameter, with larger individuals occupying larger burrows (Fig. B-5). This trend was similar between females (n = 45 individuals) and males (n = 26 individuals) .

Longevity:

Crayfish do not exhibit external annulus formation as observed in trees or fish scales, thus the approximation of age is based on the distribution of size over time. Age estimation is imprecise over a short two-year study. In order to estimate age a large number of individuals are required. The difficulty in collecting large numbers of individuals within a short time period is problematic for primary burrowing species and the following age estimates should be considered only rough estimates of the potential life span of each species.

Cambarus polychromatus (n = 493) may live for over 8 years. The species grows at a decreasing rate. Age classes are estimated as follows, age 0 – newly hatched to 36 mm CL, age 1—36 to 60 mm CL, age 2 – 60 to 82 mm CL, age 3 – 82 to 96 mm CL, age 4 – 96 to 104 mm CL, age 5 – 104 to 108 mm CL, age 6 – 108 to 114 mm CL, and age 7 – over 116 mm CL.

Cambarus diogenes (n = 374) may live for 14 years. The species grows at a decreasing rate. Age classes are estimated as follows, age 0 – newly hatched to 35 mm, age 1 – 35 to 46 mm, age 2 – 46-55 mm, age 3 – 55 to 63 mm, age 4 – 63 to 72 mm, age 5 – 72 to 83 mm, age 6 – 83 to 91 mm, age 7 – 89 to 97 mm, age 8 – 97 to 103 mm, age 9 – 103 to 108 mm, age 10 – 106 to 112 mm, age 11 – 111 to 118 mm, while ages beyond age 11 are estimated with each incremental growth. It is possible that longevity may be beyond 14 years.

Cambarus ortmanni (n = 82) may live for over eight years. Age classes are estimated as follows, age 0 – newly hatched to 36 mm, age 1 – 36 to 47 mm, age 2 – 48 to 57 mm, age 3 – 57 to 65 mm, age 4 – 65 to 73 mm, age 5 – 73 to 81 mm, age 6 – 81 to 88 mm, age 7 – 89 to 95, and sizes above 111 mm are estimated as age 8+.

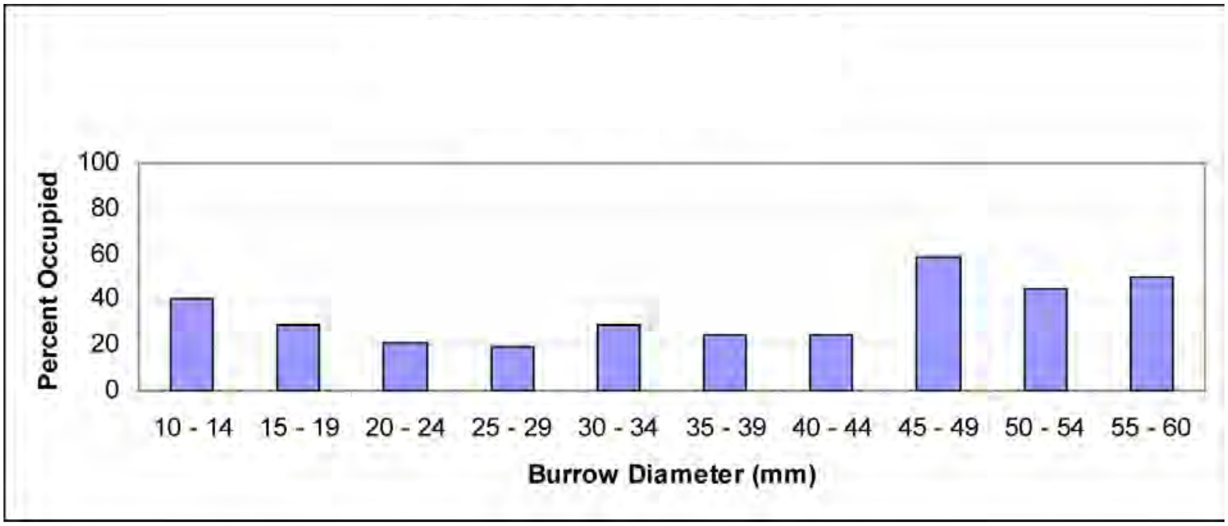

Figure B-1. Percent of occupied *Cambarus polychromatus* burrows which were grouped by size of the burrow diameter.

Table B-3. Size of individual *Cambarus diogenes* trapped by date including burrow number assignment, burrow diameter (mm), and postorbital carapace length (POCL; mm).

Cambarus diogenes

		Size of Individual Trapped										
Burrow Number	**Burrow Diameter (mm)**	**7/2/2005**	**7/3/2005**	**7/12/2005**	**7/14/2005**	**7/19/2005**	**7/21/2005**	**7/26/2005**	**7/28/2005**	**8/3/2005**	**8/5/2005**	**8/10/2005**
1	35	30	.	30	30	.	.	.	.	.	.	.
2	33	35	.	35	35	.	.	.	.	.	.	.
3	35	30	.	30	.	.	.	.	.	.	.	.
4	45	45	.	48	48	.	.	.	.	.	.	.
5	48	45	.	.	.	.	.	.	.	.	.	.
6	50	50	.	48	48	.	.	.	.	.	.	.
7	48	50	.	50	50	50	50	50	.	.	.	.
8	16	20	.	20	20	.	20	.	.	.	.	.
9	20	21	.	21	21	.	35	.	.	.	.	.
10	28	33	.	33	.	33	.	.	.	.	.	.
11	50	45	.	45	45	.	.	.	.	54	54	54
12	20	18	.	18	.	.	.	.	.	.	.	.
13	34	20	.	20	20	.	20	.	.	.	.	.
14	26	20	.	20	20	.	.	.	.	.	.	.
15	45	34	.	34	.	34	34	34	.	.	.	.
16	43	35	.	35	35	45	45	45	.	.	.	.
17	44	34	.	34	.	.	.	.	.	.	.	.
18	55	47	.	47	47	47	47	47	47	47	47	47
19	35	38	.	38	.	.	.	.	.	.	.	.
20	45	40	.	35	.	.	.	.	.	.	.	.
21	50	44	.	44	44	44	44	44	44	.	.	.
22	34	26	.	26	26	.	.	.	.	.	.	.
23	38	25	.	25	25	25	48	48	48	48	48	48
24	36	23	.	23	23	23	.	.	.	.	.	.
25	22	19	.	19	.	.	.	.	.	.	.	.
26	45	.	44	44	44	44	44	44	44	44	44	.
27	50	.	45	45	45	45	45	.	.	.	.	.
28	58	.	48	49	.	.	55	55	55	55	.	.
29	45	.	45	47	47	47	47	.	.	.	.	.
30	50	.	34	34	.	.	.	.	.	60	60	60

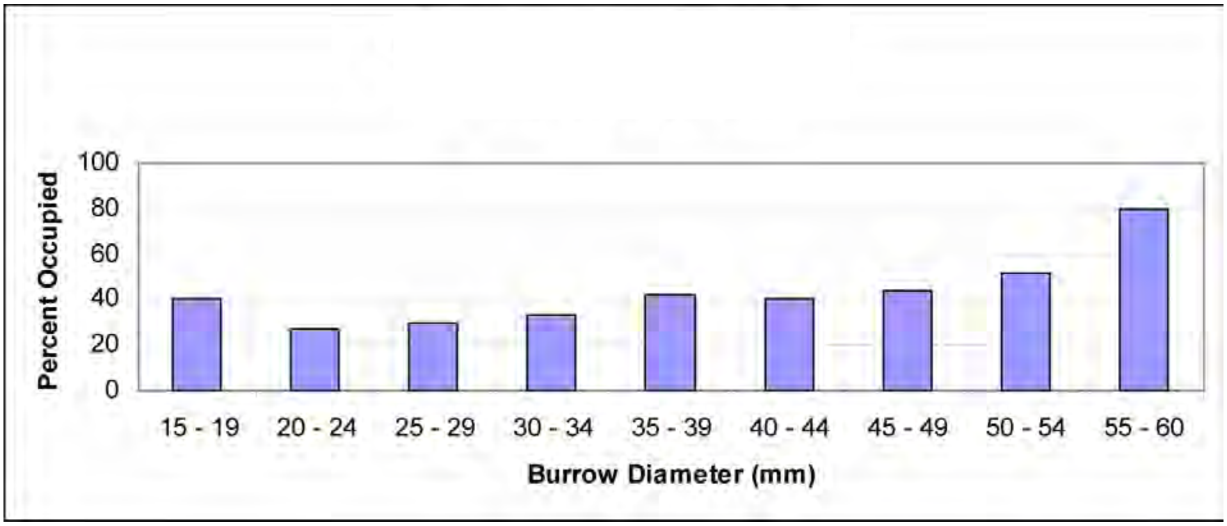

Figure B-2. Percent of occupied *Cambarus diogenes* burrows which were grouped by size of the burrow diameter.

Table B-4. *Cambarus diogenes* burrow fidelity based on burrow number assignment including days with same individual, occupied trap dates, number of different individuals, and qualitative assessment of individual size replacement.

Cambarus diogenes

Burrow Number	Days with Same Individual	Days With Occupied Traps	Number of Different Individuals	Size of Replacing Individual
1	12	3	1	.
2	12	3	1	.
3	10	2	1	.
4	2	3	2	larger
5	.	1	1	.
6	2	3	2	smaller
7	24	6	1	.
8	19	4	1	.
9	12	4	2	larger
10	17	3	1	.
11	12 and 7	6	2	larger
12	10	2	1	.
13	19	4	1	.
14	12	3	1	.
15	24	5	1	.
16	12 and 7	6	2	larger
17	10	2	1	.
18	39	10	1	.
19	10	2	1	.
20	.	2	2	smaller
21	26	7	1	.
22	12	3	1	.
23	17 and 20	10	2	larger
24	17	4	1	.
25	10	2	1	.
26	33	9	1	.
27	18	5	1	.
28	9 and 13	6	2	larger
29	9	5	2	larger
30	9 and 7	5	2	larger

Procambarus gracilis (n = 13) may live for over five years. Age classes are estimated as follows, age 0 – newly hatched to 31 mm, age 1 – 31 to 33 mm, age 2 – 43 to 45 mm, age 3 – 49 to 53 mm, age 4 – 57 to 61 mm, age 5 – 63 to 69 mm, age 6 – 69 to 77 mm, and age 7+ – 77 to 83 mm.

Fallicambarus fodiens (n = 66) may live for at least seven years. Age classes are estimated as follows, age 0 – newly hatched to 35 mm, age 1 – 35 to 45 mm, age 2 – 45 to 55 mm, age 3 – 57 to 67 mm, age 4 – 67 to 73 mm, age 5 – 73 to 78 mm, age 6 – 79 to 85 mm.

Discussion

Nearly equal sex ratios were found for *Cambarus polychromatus*, *C. diogenes* and *Fallicambarus fodiens* during this study.

Burrowing crayfish have been studied in little detail, but there have been a few studies concerning their burrows and the microhabitat around the burrows. Punzalan *et al.* (2001) reported that *Fallicambarus fodiens* can distinguish between conspecific-built burrow chimneys and human-built chimneys, which suggests that chemical cues are important for burrowing behaviors of the species. When chemical cues of both humans and crayfishes were removed from their experiments, *F. fodiens* could not discriminate between human-built and conspecific-built chimneys. Another study on the burrow behavior of *F. fodiens* showed that individuals are attracted to areas with

Cambarus polychromatus (n = 38 individuals)

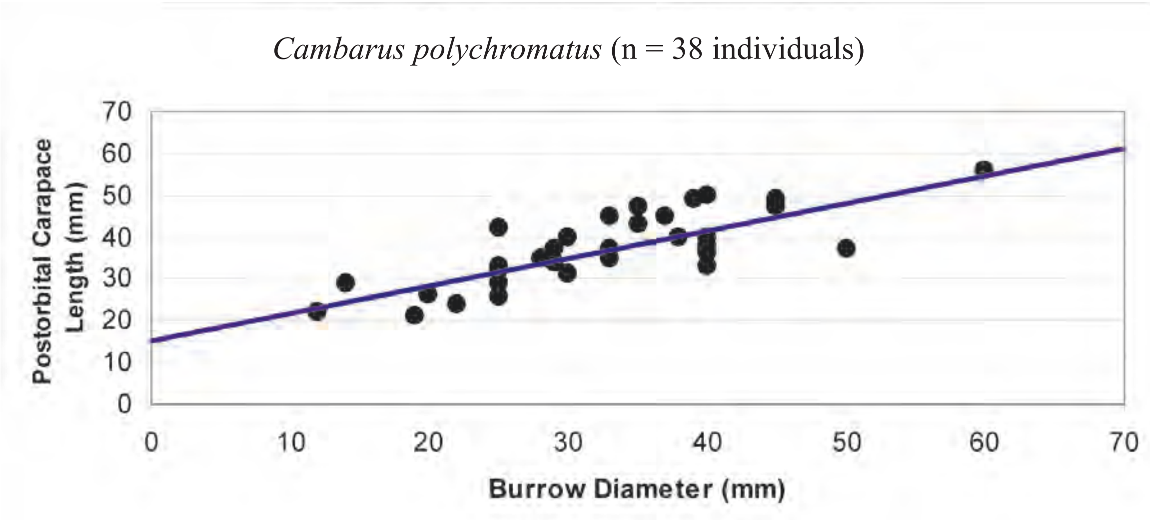

Figure B-3. Linear regression between burrow diameter and the post-orbital carapace lengths of *Cambarus polychromatus* individuals.

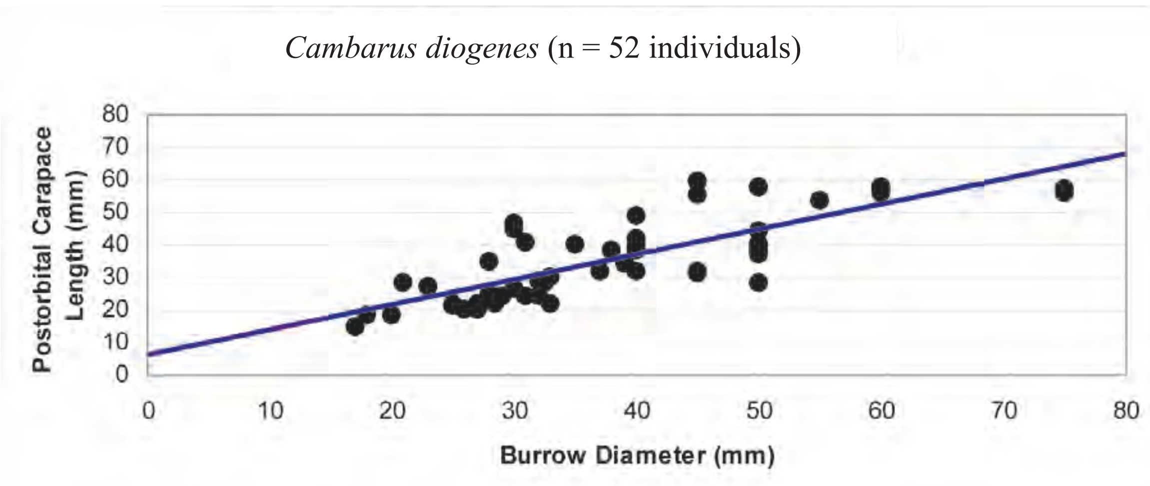

Figure B-4. Linear regression between burrow diameter and the post-orbital carapace lengths of *Cambarus diogenes* individuals.

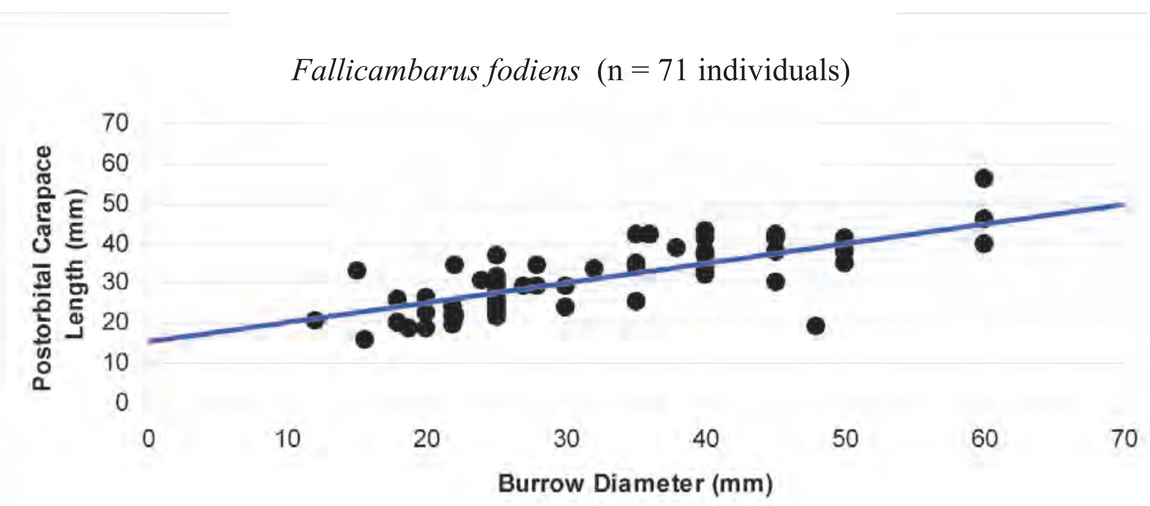

Figure B-5. Linear regression between burrow diameter and the post-orbital carapace lengths of *Fallicambarus fodiens* individuals.

clusters of chimneys and that new crayfish tended to build burrows in the same area of their conspecifics rather than new uninhabited areas (Trepanier & Dunham 1999). Additionally, Trepanier & Dunham (1999) suggested that the presence of burrows in an area is necessary for maintenance of the population structure over long periods of time because of the reluctance of crayfish to build burrows in new unoccupied areas. Both studies on *F. fodiens* reported that burrows were shared between individuals and that the species did not exhibit burrow defense behaviors against conspecifics. During this study, *Cambarus polychromatus* and *C. diogenes* did not show high levels of burrow fidelity and in cases of replacement, the new occupants were both smaller and larger than the previous occupants. Therefore, it appears that these species do not exhibit burrow defense behaviors. Additionally, although these species occur in similar habitats, crayfish burrows were used exclusively by members of the same species, not shared or replaced by other species.

Crayfish longevity is difficult to estimate and few studies have been conducted that have accurately determined precise ages. Norrocky (1991) demonstrated that *Fallicambarus fodiens* can live for seven years in Ohio. This study seems to support Norrocky's findings. Little information is available for the other burrowing crayfish. Crayfish grow at a decreasing rate and at the oldest ages somatic growth may be indeterminate. Age estimates suggest that primary burrowing crayfish may live for five to 14 years. Since these estimates are speculative, actual longevity may differ.

Life History Species Accounts (RFT/MBI)

Cambarus polychromatus

Burrow architecture: This study is the first effort to study and report on *Cambarus polychromatus,* described in 2005. The burrow architecture is intermediate between *C. diogenes* and *F. fodiens*. The species tends to have fewer entrances than *C. diogenes* but usually more than *F. fodiens*. It usually has a chamber at the bottom (approximately 1 meter deep) and slightly over half have lateral tunnels. It is least likely to have a chimney. This last fact is likely related to the species' feeding behavior, which is discussed later. As in the other two species, a main burrow extends in a vertical disposition to the bottom of the system. If more than one entrance is present, the entrance burrows extend at an angle to a point approximately 40 cm underground where they meet and the main burrow begins its vertical decent. Burrows are placed away from standing water, so a portion of the burrow lacks water. The crayfish spends much of its time in the waterless area of the burrow.

Burrowing behavior: Burrowing behavior is similar to that reported by Hobbs, Jr. (1981) and Ortmann (1906), and discussed later in the *C. diogenes* portion of this section. *Cambarus polychromatus* is very closely related to *Cambarus thomai*, the species Ortmann studied in Pennsylvania.

Feeding behavior: *Cambarus polychromatus* displays a very interesting feeding behavior. Like the other two species discussed, *C. polychromatus* spends time outside its burrow in surface waters during spring. At this time it is observed to feed heavily, frequently having the remains of organisms in its chelae. It also eats plant material especially in the vicinity of its burrow and any roots that grow into the burrow are cropped off. Some burrows of this species have been found to have fresh plant material, usually leaves, at the bottom that was most certainly brought there by the resident crayfish. The truly unique feeding behavior is its habit of waiting at the mouth of its burrow and pouncing on any small organisms that pass by. Unlike *C. diogenes*, this species can be found at its burrow entrance all times of the day and night, and is found further out of the entrance the darker it is. In its burrow the hard remains of small invertebrates can be found such as land snails and beetles. The cumulative evidence for *C. polychromatus* indicates it is an active predator that uses a wait and pounce approach to capturing its prey.

Activity period: This species is active during all seasons, except for the coldest portions of winter when the ground is frozen. Mr. Peter Nord (personal communication) of the greater Cincinnati area informs me that the *C. polychromatus* colony in his yard (identified by RFT) remains active into November and resumes activity in March as soon as the ground thaws. As with the other species discussed, the greatest activity is associated with a spring mating period in which adult individuals leave their burrows to enter surface waters resulting from warm spring rains. It is also active at all times of day becoming more brazen as darkness increases.

Migration: No published reports or direct evidence of migratory movements currently exist. It is inferred from the data presented in the INBS-ARC report and observations by RFT that a similar movement related to spring activities such as feeding and mating occurs in this species as in *C. diogenes* and *F. fodiens*. It is also likely movement between burrows occurs during summer and fall when weather conditions are favorable (rain or high humidity).

Table B-5. Reproductive life stages for *Cambarus polychromatus* and the sources of information.

Source/month	Stage	J	F	M	A	M	J	J	A	S	O	N	D
Indiana study	M-I			■	■	■	■	■	■	■			
OSUMC	M-I	■		■	■		■	■	■	■			
Indiana study	F-ovig.					■	■	■		■			
OSUMC	F-ovig.	■				■							

Molting: Little is known about molting in this species. At best, we can only speculate, based on evidence for *C. diogenes* and *F. fodiens*. Observations of large adult males reveal similar wear patterns on hard body parts as seen in *C. diogenes*. *Cambarus polychromatus* also attains a large size similar to *C. diogenes*. Very few large second form males have been seen. Extrapolating from these observations, it seems reasonable to postulate: a similar life span of six or more years is likely; that young individuals molt more frequently than adults; molting in adults likely occurs most frequently in fall and spring; growth increments are likely minimal in the largest individuals; and, a year or more could pass between molts in the oldest individuals.

Reproductive factors: Data from this study and The Ohio State University Museum of Biological Diversity are used to discuss reproductive life stages for this species (Table B-5). All data reported for *C. polychromatus* in Thoma *et al.* (2005) is contained in the OSUMC database so that paper will not be discussed here. The study data show that first form males are present from March thru September, and ovigerous females are encountered primarily in May, June, and July. These data indicate a later reproductive cycle than *C. diogenes* and *F. fodiens* with mating occurring from spring to late spring and egg laying in late spring/early summer. First form males and females have been observed cohabitating single burrows so it is likely mating occurs in the burrow and above ground. No females with YOY attached have been recorded.

Cambarus diogenes

Burrow architecture: The shapes of most primary burrowing crayfish species' burrows are very similar. They usually have from 1 to 3 entrances, 1 chimney, some times 2 or more depending on the number of entrances, usually 1 entrance without a chimney, a main vertical shaft where the angled tunnels associated with the entrances come together (approximately 15 to 30 cm underground), and a small chamber at the bottom of the main shaft approximately 1 meter underground. This fact has been observed and reported by numerous researchers (Ortmann 1906, Hobbs, Jr. 1981, Hobbs III & Jass 1988, Page 1985, and Pflieger 1998) and *C. diogenes* is no exception. All burrows of this species have a main burrow shaft that extends vertically to the bottom and chimneys on some of the entrances. Occasionally burrow entrances will be purposely plugged (from within), have side tunnels that run laterally, and entrances that open to surface waters. Entrances to open water were not observed in this study. All burrows, without exception for this species, have a portion that is not submersed in water. Here the crayfish resides when not active or overwintering.

Burrowing behavior: Hobbs, Jr. (1981) and Ortmann (1906) have given excellent accounts of the burrowing behavior of crayfish. Hobbs discussed burrowing crayfish in general and Ortmann discussed *Cambarus thomai* in Pennsylvania though he referred to the species as *C. diogenes*. The author (RFT) has and is currently maintaining live *C. diogenes* in containers with approximately 60 cm. of soil substrate and observing their burrowing behavior. Also numerous observations of wild populations have been made *in situ*. All observations comport with those made by Hobbs, Jr. and Ortmann. The burrowing behavior observed and reported is as follows: the crayfish uses the chelae of the first walking legs with its fingers agape to dig into the substrate and dislodge soil; this is then drawn to the body in the area of the mouth; and, the second pair of legs and the third maxillipeds are then used to secure the soil, which is carried to the top of the burrow (frequently a chimney) and deposited. The chelae of the first walking legs are used to position and adjust the soil pellet before the crayfish backs into its burrow to retrieve more soil. Hobbs, Jr. (1981) has made a convincing argument from existing research in the literature that chimneys provide an important function by enhancing air circulation in the burrow through action on area wind currents.

Feeding behavior: Primary burrowing crayfish are somewhat difficult to study because they are fossorial. In addition, *Cambarus diogenes* does not forage during daylight hours. Foraging for food occurs at night and within the vicinity of the burrow entrance during summer periods. In spring it has been observed that while out of their burrows and in open water *C. diogenes* feeds heavily on all forms of matter, including plants, animals, and detritus. In general, food intake is more governed by availability than preference.

However, proteinaceous material is preferred over plant material. Individuals have been observed to abandon plant material being eaten when animal material is present. Roots and root hairs are absent from their burrows, presumably because they have been eaten. Vegetation near the burrow entrance is always eaten back. Active hunting has not been observed but some form of predation is likely practiced. Again, in spring, the species has been observed out of its burrow and consuming prey items, usually invertebrates, though salamanders have been seen being consumed. A common occurrence relayed by researchers studying salamanders in vernal pools is that minnow traps set for salamanders that are retrieved with *C. diogenes* in them will be devoid of whole salamanders (though small pieces may be found) while traps without crayfish will have one to numerous salamanders in them. These individuals understandably have a strong loathing for crayfish.

Activity periods: *Cambarus diogenes* is active during all but the coldest periods of the year. Though it is not known with certainty, it is not thought to be likely that any activity occurs in the winter within the confines of the burrow. The most dramatic, and likely the most important seasonal activity period, is late winter and early spring. The first activity observed for the species is an initial cleaning of the burrow after the ground warms enough to be above freezing. When air and water temperatures are sufficient (the specific temperature is not known) and heavy spring rains occur, they leave their burrows and enter surface waters resulting from the warm spring rains. It appears, from the numbers present in vernal pools, that a mass movement of adult crayfish occurs at this time. Small juveniles are not seen. Considerable matting and feeding occurs while out of the burrow in spring. It is speculated that the majority of food consumed by large adult individuals takes place at this time. After their vernal revelry, major activity outside the burrow is confined to periods of heavy rain, flooding, and high humidity. Activity on a daily scale, not discussed above, is confined to the burrow and immediate area of the entrance. As evening approaches and into night *C. diogenes* can be observed at the entrance to its burrow. It appears to move up and down its burrow in response to light intensity as on cloudy days some individuals will be observed near the entrance.

Migrations: As discussed above, adult *C. diogenes* migrate in spring, moving from their burrows to open water and back to burrows as vernal pools begin to dry and warm. The impetus appears to be mating along with foraging. On a daily scale, movement up and down the burrow occurs in response to light intensity.

Table B-6. Reproductive life stages for *Cambarus diogenes* and the sources of information.

Source/month	Stage	J	F	M	A	M	J	J	A	S	O	N	D
Indiana study	M-I		■	■	■	■	■	■	■	■			
OSUMC	M-I		■	■	■	■	■		■	■			■
Page 1985	M-I		■	■	■						■	■	
Hobbs III 1988	M-I				■	■	■	■	■	■	■		■
Pflieger 1996	M-I												
Taylor … 2004	M-I			■	■								
Hobbs, Jr. 1981	M-I	■			■						■		

Source/month	Stage	J	F	M	A	M	J	J	A	S	O	N	D
Indiana study	F-egg.					■							
OSUMC	F-egg.												
Page 1985	F-egg			■	■	■							
Hobbs III 1988	F-egg			■	■	■							
Pflieger 1996	F-egg			■									
Taylor … 2004	F-egg				■								
Hobbs, Jr. 1981	F-egg									■			

Source/month	Stage	J	F	M	A	M	J	J	A	S	O	N	D
Indiana study	F-YOY												
OSUMC	F-YOY												
Page 1985	F-YOY					■	■						
Hobbs III 1988	F-YOY					■	■	■		■	■		
Pflieger 1996	F-YOY												
Taylor … 2004	F-YOY												
Hobbs, Jr. 1981	F-YOY												

Molting: Molting can occur at any time, but for adults it has most frequently been observed in fall and spring. Very young individuals and young of year (YOY) molt frequently. Observations by RFT are that the smaller and younger a crayfish is the more frequently it molts. In this species, which attains a large size, there are indications that the largest individuals may not molt each year and may reach a size at which they never molt again though they will live at least a year more. Numerous individuals have been examined that have heavily worn body parts (mandibles and gonopods) that indicate long use. The largest males are usually first form which may be the result of attaining mating stage and not ever molting again.

Reproductive factors: Examination of the database derived for this study, The Ohio State University Museum of Biological Diversity Crayfish Collection database, and the literature, clearly indicates mating and reproduction begins in late fall and peaks in spring (Hobbs, Jr. 1981, Hobbs III & Jass 1988, Page 1985, and Pflieger 1998). Table B-6 gives a graphic presentation of the reproduction related life stages that indicates a concentration of activity in spring that extends into summer. Life stages are presented in the order of those that must occur first before the next stage can follow. Hobbs III (1988) states "…copulation usually occurs in the burrow." while Pflieger (1996) reports mating occurs in the burrow and open water and Page (1985) states mating occurs outside of the burrow. These conclusions are likely influenced by the likelihood of observing the crayfish, which is always easier when they are out of their burrows.

Where mating, egg laying, and care of the young occurs is not clear from the data collected and the scientific literature. Five collections of egg bearing females were made during this study and all were from burrows. Hobbs III, 1988 states copulation usually occurs in the burrow, egg laying occurs in the burrow and that gravid females leave the burrow for open water during March, April, and May and return to the burrow after the young are released. Pflieger (1996) and Page (1985) state mating can occur in or outside the burrow. Page further states that females with eggs and young can be found in burrows or above ground.

During this study and other research activities it has been observed that independent young usually appear in surface waters most commonly in June and July, and that by August and September they have begun to construct burrows. At the Bloomfield Barrens burrow ecology site hundreds of YOY were observed in pools of water in the ravine during the July visit.

Fallicambarus fodiens

Burrow architecture: The burrows of *Fallicambarus fodiens* tend to be less complex than most other primary burrowing crayfish species. They have been observed to have up to 3 entrances, but usually had only 1. Unless obstructed by a tree root or rock, the main burrow extends in a vertical disposition. During the summer period, most burrows have been observed to have chimneys present, and the burrow is usually plugged from within at the entrance or below the surface. Burrows usually extend to a depth of approximately 1 meter and frequently lack water at the peak of summer. Burrows of this species observed in spring frequently have lateral tunnels that run just under the surface and through the root zone of herbaceous vegetation. Chambers can be found at the bottom of a burrow, but normally this feature is lacking.

Burrowing behavior: No observations of burrowing technique of this species have been reported in the literature. Observations by the author are the same as those reported by Hobbs, Jr. 1981 and Ortmann 1906, and reported previously in the *C. diogenes* portion of this section.

Feeding behavior: Crocker and Barr (1971) state the principle food items of this species are vegetation, but that animal matter is also accepted. Page (1985) reports plants, insects, crayfish, an isopod, and a salamander as food items for *F. fodiens*. Captive material studied by RFT has shown a low acceptance of animal matter as compared to other burrowing species. No individuals observed in the wild have been seen consuming animal matter. The feeding behavior of *F. fodiens* appears to essentially differ from the other 2 species reported herein. It does not appear that they feed over extensive periods of the year and some populations may feed only in the spring while they are out of the burrow in surface waters.

Activity periods: The most extensive report on this species' activities (and reproduction, migration, longevity, etc.) is provided by Norrocky (1986). Norrocky reports the species is active above ground during periods of high water. Page (1985) reports the same. Observations by RFT and data from this study indicate that *F. fodiens* is most active in late winter and spring. It appears from the observations made for this study, that the species seals its burrow with a plug in early summer and remains within until late winter when the ground thaws and spring rains create high water conditions. At this time large numbers of adults emerge from their burrows and enter surface waters where they remain until water levels drop or temperatures rise.

The most interesting or noteworthy aspect of this species' life history, discovered in part by this study, is the extended summer period of inactivity. In the Burrow Ecology section it is reported that the species plugged its burrow after the spring sampling visit and remained in the burrow, plug in place, for the remaining visits (summer and fall). In combination with this field observation, captive individuals kept by RFT have been found to go into a torpor state when left undisturbed in individual aquaria for periods up to 1 month. Unlike *C. diogenes* and *C. polychromatus*, *F. fodiens* did not respond immediately when approached, but only after being physically disturbed 3 or more times did they begin to move and finally strike the typical defensive posture of all crayfish by raising the first walking legs with the fingers agape ready to pinch the intruder. It is thought this species generally has a period from late fall to late spring, minus the depths of winter, during which it is active accomplishing its life history requirements of reproduction and feeding. This life history pattern differs from all other crayfish species reported on.

Migrations: Norrocky (1986) conducted mark and recapture studies on large numbers of individuals (232 individuals) from 1983 thru 1990 at two sites. Considerable movement was documented in the study with movements from burrow to burrow of 0.15 to 66 meters and an average movement of 8.9 meters. One hundred thirty marked individuals were found to have changed location. Incidence of burrow cohabitation were documented for all possible combinations of male-I, male-II, and female ovigerous and not. Even interspecies cohabitations were observed between *F. fodiens* and *C. diogenes* (= *C. thomai*).

Molting: Page (1985) and Norrocky (1986) both reported on molting and life expectancy for *F. fodiens*. They differed considerably in their conclusions. Page used a size frequency histogram of carapace lengths to discern age groups and concluded there were two age groups and that the species had a 2-year life expectancy. Norrocky used mark and recapture results from a six-year period, recaptured some individuals every year of the study and concluded the species live six or seven years. It is very difficult to argue with the direct evidence provided by Norrocky. In addition, Norrocky measured each individual each time it was captured and found several individuals, both male and female, that did not molt over a 1-year period. Growth rates were reported to be 1.39 mm per molt. This is a very small increment and the use of a size frequency histogram is not likely to detect the small differences between one age cohort and another.

It is believed that Norrocky's life expectancy is conservative and *F. fodiens* likely lives longer than seven years. This pattern of life expectancy could be applicable to many other primary burrowing species.

Reproductive factors: Norrocky gives the best account of the reproductive life cycle of *F. fodiens* (Table B-7). Mating occurred in fall, eggs were laid in fall, carried through winter and into spring, and were all hatched by the end of April. Crocker and Barr, 1971 reported mating in both fall and spring. Norrocky reported first form males were present at all times of the year. Page (1985) and Taylor and Schuster (2004) generally agree with this reproductive pattern. The only divergence found is in the collections housed at The Ohio State University Museum of Biological Diversity that contain samples from July and August with ovigerous females. The young disperse from their maternal burrow in summer to establish burrows of their own (Norrocky 1986).

Table B-7. Reproductive life stages for *Fallicambarus fodiens* and the sources of information.

Source/month	Stage	J	F	M	A	M	J	J	A	S	O	N	D
Norrocky 1986	M-I	■	■	■	■	■	■	■	■	■	■	■	■
Page 1985	M-I				■								
Taylor and Schuster 2004	M-I			■	■	■							
OSUMC	M-I	■	■	■	■	■	■	■	■	■	■	■	■
Indiana study	M-I					■	■	■	■				
Norrocky 1986	F-ovig.	■	■	■	■						■	■	■
Page 1985	F-ovig.		■	■	■								
Taylor and Schuster 2004	F-ovig.		■	■									
OSUMC	F-ovig.		■	■	■	■		■	■		■		
Indiana study	F-ovig.												

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Task 3

Burrow Ecology

Field work and analyses for this section was performed by the Midwest Biodiversity Institute, Columbus, Ohio.

Burrow ecology—Task 3

Introduction

A total of 353 individual burrows at eight sites in Indiana were examined for their general morphology, crayfish occupants, and other non-crayfish organisms. An additional site was examined three times during the course of this study, but no primary burrowing crayfish were found. Study sites were located in the northwest, northeast, northcentral, southwest, southeast, mid-south, mid-western, mid-eastern, and mid-central areas of the State (Fig. C-1). The nine total sites and their locations are described below.

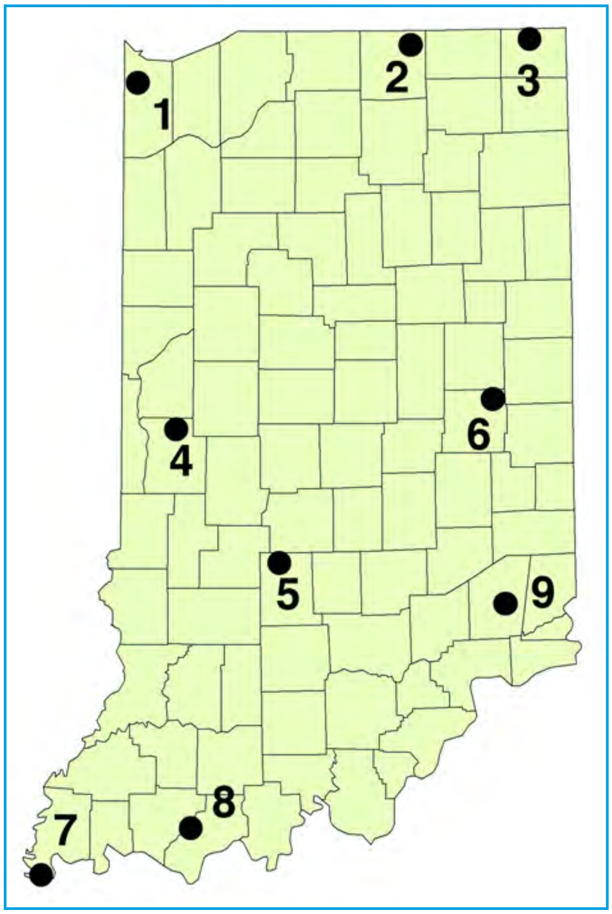

Figure C-1. Location of Burrow Ecology study sites in Indiana. Numbers correspond to text.

General description of sample sites

1) Hoosier Prairie State Nature Preserve – Northwest Indiana, Lake County, Calumet Township, at the southwest edge of Griffith, IN. The area is a wet prairie habitat with oak islands dispersed throughout. The substrate consists of a deep layer of sand (~ 60 cm thick) overlain with a thinner (~ 30 cm thick) organic layer, and underlain by a clay-rich, impervious, hardpan. This site was unique in its overall characteristics for this portion of the study in two ways. No other site with crayfish had the high quantities of sand observed here and the water table was just below the surface keeping the sand layer moist. This is likely why burrowing was possible at this site as the moisture allowed the sand to hold a burrow shape and not collapse.

2) Pipewort Pond State Nature Preserve – Northcentral Indiana, Elkhart County, Washington Township, north of Bristol. Pipewort Pond is a glacial kettle. The pond is surrounded by a narrow, wooded riparian zone of 10–50 meters width primarily comprised of oak trees. The northern portion of the pond is a floating sphagnum bog. Surrounding areas are old-field dominated by fescue grass. Soils had very high sand content. No crayfish or crayfish burrows could be found during the three visits to this site. It is likely the high sand content and the dryness of the soils makes them unsuitable for burrowing but it is unclear why the pond itself had no crayfish. The sand layer with Pipewort Pond on it is perched on a layer of clay dominated glacial till. Pipewort Pond State Nature Preservie is included to present habitat information about a site with no primary burrowing crayfish, and is not discussed from this point forward.

3) Potowatomi State Nature Preserve – Northeastern Indiana, Steuben County, Jamestown Township, at Pokagon State Park. The sample area was a deeply wooded (mature oak) glacial end moraine habitat with a small stream and a vernal pool. Soils were of the normal rock, gravel, clay composition found in end moraines. This was over laid with woodland humus. Both the stream and vernal pool areas were sampled.

4) Turkey Run State Park – Westcentral Indiana, Parke County, Sugar Creek Township, northeast of Bloomingdale. The sample area is located along the southern side of the Sugar Creek valley. Two separate sample sites were used. One was a hillside spring at the base of a hill with the Sugar Creek flood plain; the other was an acidentally created sedimentation basin adjacent a road and at the base of a hillside rivulet in the Sugar Creek flood plain. Both sites were in mixed mesophytic forest. The spring site had high gravel; rock content and the sedimentation basin had high clay content. The two sites were widely separated from each other by approximately 0.3 miles.

5) Beanblossom Bottom Nature Preserve – Central Indiana, Monroe County, Bloomington Township, northeast of Ellettsville. The sampling site was an old-field floodplain that had previously been used for row crop farming approximately 5 years prior. Dominant vegetation was herbaceous plants with some small trees. Soils were high in clay content and low in organic material.

6) Summit Lake State Park – Eastcentral Indiana, Henry County, Stony Creek Township, at eastern end of Summit Lake along the southern shore. Three individual areas were sampled at this site (due to the low abundance of burrows). Two of the areas were in managed prairie habitat that was burned every year and one was on the lake shore in a wooded area. The lake shore site was at a spring like habitat produced by a broken field tile. Soil was rocky and gravelly with high clay content and vegetation was a second growth woods that was formerly barnyard. The prairie sites were formerly row crop fields 5 years prior. One was in a historic pothole that had been drained and was near to the lake shore site and the other was in a swale adjacent the lake approximately 0.4 miles away. Vegetation was herbaceous, dominated by big bluestem grass.

7) Twin Swamps State Nature Preserve – Southwestern Indiana, Posey County, Point Township, just west of Hovey Lake. The site was a mature oak-maple forest adjacent a swamp stream. Soils were very high in clay. Very little humus had developed at the site likely because the area was periodically inundated for extended periods by the swamp stream. No cypress trees were growing in the vicinity.

8) Bloomfield Barrens State Nature Preserve – Southcentral Indiana, Spencer County, Grass Township, just northwest of Bloomfield. The site is located in a mature forest dominated by oak, beech, and maple trees. A small ravine (intermittent) running into Little Pigeon Creek was the area where sampling was conducted. Soils were high in clay content with a leaf litter humus over layer.

9) Falling Timber State Nature Preserve – Southeastern Indiana, Ripley County, Johnson Township, in Versailles State Park at confluence of Falling Timber Creek with Versailles Lake. Burrows were located in two habitat types, along the stream, within mature woods and along the Lake's margin in a mown lawn area. Only four burrows were found within the woods and none could be found within the nature preserve boundaries where soils were thin and underlain by limestone bedrock. Habitat at the lawn was a park setting with picnic benches located between the Lake and a paved parking lot. Soils had a moderate clay content. Water levels were governed by lake levels and the colony is likely a post impoundment development.

Methods

Burrow sampling methodology – Site selection was made using two basic criteria: finding areas that were least disturbed; and, spacing sampling sites out within the state to be able to detect any regional or meteorological related differences. Three sites (1 north, 1 middle & 1 south) were visited three times each year to allow for detection of seasonal and latitude influences. Sites were sampled during 2004 in the west (#s 1, 4, 7), during 2005 in the middle (#s 2, 5, 8), and during 2006 in the east (#s 3, 6, 9).

On the first visit to a site, each area was surveyed to find the best or densest concentration of burrows. Ten active (Fig. C-2) and ten inactive burrows (Fig. C-3), if available, were then marked with flagging. Burrows were judged to be active if they displayed any of the following characteristics: freshly excavated wet mud at an entrance; a lack of root hairs, spider webs, or

Figure C-2. Active crayfish burrow entrances. A (left) an active burrow from Falling Timber showing fresh mud, B (right) a plugged burrow from Twin Swamps.

Figure C-3. An inactive burrow at Hoosier Prairie. Note disorganized appearance of the entrance and plant material at edge of burrow.

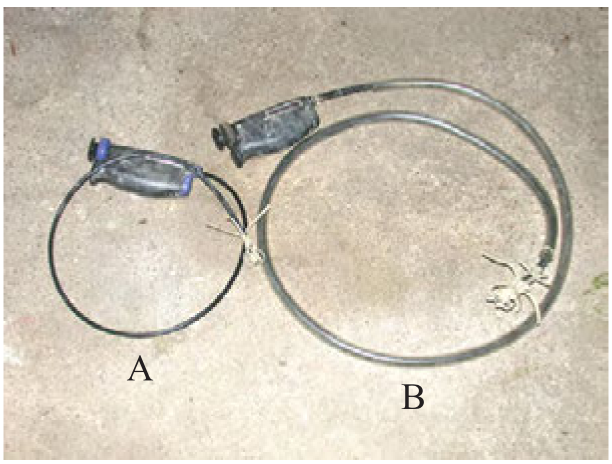

Figure C-4. Fiber optic scopes used to examine crayfish burrows. A 1 meter. B 2 meters.

other debris at the entrance mouth(s); all entrances plugged from the inside; vegetation near the burrow entrance trimmed away; or, very smooth walls at the entrance (Fig. C-2 A&B). Inactive burrows were those that displayed the opposite of the conditions listed above (Fig. C-3).

Once a burrow was selected for sampling, measurements of the most active burrow entrance's width was obtained. A fiber-optic scope was then used to examine the depths of the burrow. Crayfish, other organisms, side tunnels, and chambers observed were noted. Examination of the inner burrow area had to be conducted slowly to ensure one was able to see all characteristics present. Once the bottom of the burrow was reached, the scope was removed, noting the high point reached on the cable, and a measurement was taken of the total length and the length to the wet point on the cable to represent total burrow depth (former) and depth to water (latter). Two fiber optic scopes were used, one 2 meters (B) in length and another 1 meter (A) in length (Fig. C-4).

After examination of the burrow and determination that no vertebrate species were present, the burrow was pumped to extract any organisms present. A burrow pump is created by attaching a 12 volt DC recreational vehicle water pump to a 5-gallon, sealable bucket with a gasket fitted, removable lid (Fig. C-5). The bucket was affixed with two attachments for tubing, one near the top and one near the bottom. The bottom attachment was connected to the water pump so that the pump drew water out of the bucket at the bottom. The top attachment was used for the hoses (of different diameter

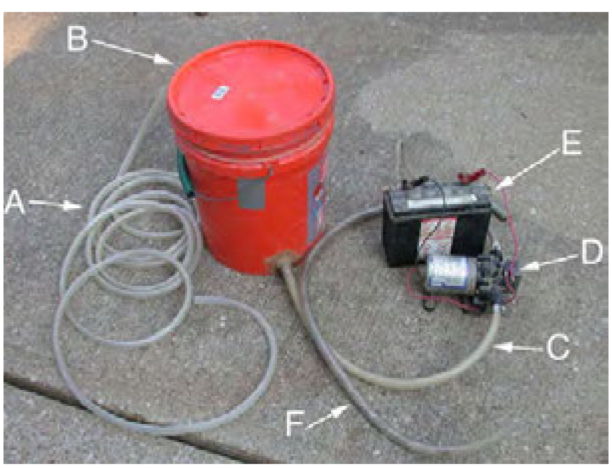

Figure C-5. Burrow pump employed for extraction of burrow co-inhabitants. A - intake hose, B - filtering bucket, C - water removal hose, D - 12 volt water pump, E - 12 volt battery, F - discharge hose.

Figure C-6. Burrow pump parts. From bottom left to upper right; elastic band for securing filtering material, 2 filter cloths, internal filtering bucket, 5 gallon bucket with gasket lid, water pump, 12 volt battery, and optional size hoses.

for different size burrows) that were inserted into the crayfish burrow. Water entered the bucket at the top and was drawn out at the bottom. Inserting the bottom half of another bucket covered on top with filtering cloth into the main bucket created a filtering mechanism. The inserted filtering bucket had a hole in its bottom to allow filtered water to pass through and strings at its top to allow removal of the filter after sampling was completed (Fig. C-6).

The 5 gallon bucket was filled ¾ full with water prior to pumping and sealed with the lid. Water for pumping was obtained from surface sources at the site. This water was filtered twice, once when going into a carrying bucket and once again when going from the carrying bucket into the pumping bucket. At some sites, surface water was obtained from nearby streams or wetland pools (Potowatomi N.P., Bean Blossom Bottom, Summit Lake, Twin Swamps N.P., Bloomfield Barrens, and Falling Timber N.P.). At other sites, a hole had to be dug to reach ground water that could be dipped out and into the carrying bucket (Hoosier Prairie and Turkey Run). After sealing the bucket the burrow hose was inserted to the bottom of the burrow and the pump connected to a 12 volt motorcycle battery. As the pump extracted the water from the bucket vacuum pressure began to build. Water pumped from the bucket was discharged to the top of the burrow and used to rinse any organisms in the burrow to the bottom of the burrow where the water was being extracted. Once the negative pressure in the bucket was great enough, the burrow water would begin to travel up the burrow hose and spill into the filtering mechanism at the top of the bucket. Pumping of the burrow via recirculation of the water would continue until no further material was observed coming up the burrow hose (clear tygon tubing) or no further water could be extracted. This normally took 5 to 10 minutes to accomplish.

When pumping was completed, the bucket lid was removed, the filter examined for organisms to be preserved individually or released, and the filter mechanism removed with the aid of the strings. The filter cloth was then removed, folded into a pouch, and rinsed with the water remaining in the bottom of the pumping bucket. All material captured in the filter was then preserved in a jar with 70% EtOH, a label inserted in the jar, and the jar stored for transportation to the lab for identification.

After pumping the burrow an effort was made to extract any resident crayfish from the burrow. The burrow entrance was widened enough to pump it by hand, the burrow was filled with water, pumped by hand and if a crayfish was induced to surface it was captured. All captured crayfish were identified to species, measured, and sex determined. During the first year's effort, captured crayfish were returned to their burrow. On follow-up sampling trips, previously examined burrows were examined again. By the end of the year's sampling none of the returned crayfish had been seen again and it was concluded that all had abandoned their burrows. It appeared the level of disturbance created by the sampling efforts had induced any resident crayfish to move to other burrows. During years 2 and 3, crayfish were no longed returned to their burrows. If a resident crayfish could be identified to species by use of the burrow scope it was not extracted from its burrow. Crayfish identified with the burrow scope and not extracted from their burrow were found to continue inhabiting their burrow.

Sample identification: All collected burrow material was sorted in the lab by naked eye on both white and black backgrounds. Only macroinvertebrates were sorted from the samples. No effort to retrieve microscopic organisms was attempted. Organisms sorted from the samples were identified using Pennak 1953, Fitzpatrick 1983, Borror and White 1970, Bouchard, Jr. 2004, and Coovert 2005. An effort was made to identify organisms to at least the family level. Some organisms of mature age could be identified to lower taxonomic level. Dragonfly larvae were taken to Dr. Bob Glozhobber of The Ohio Historical Society for rearing and identification.

Results

Sample site specifics (Tables C- 1 & C-3[appendix])

Hoosier Prairie: Fifty-one burrows were examined at this location, 23 were inactive and 28 (55%) were active. Twenty-two or 78.6% of the active burrows were found to have crayfish in them, 2 *Procambarus acutus* (9%), 3 *Orconectes immunis* (14%), and 17 *Fallicambarus fodiens* (77%). Only two burrows had 2 entrances. Average depth to water was 24.3 cm, average total burrow depth was 34.5 cm and average water depth was 10.2 cm. Twenty burrows had chimneys of 8.7 cm average height. Twenty-three burrows had plugged entrances. None of the plugs were sub-surface, that is, lower in the burrow than at the immediate top. Ten burrows had lateral tunnels extending from the main burrow tunnel and 7 burrows had enlarged chambers at their bottom. On average this site's water levels were closest to the surface.

Pipewort Pond: No burrows were observed at this study site.

Potowatomi State Nature Preserve: Forty burrows were examined at this location, all (100%) were judged to be active. Seventeen or 42.5% of the active burrows were found to have crayfish in them, all were

Table C-1. Burrow characteristics by sampling area.

Site	# of Burrows	Active %	Occupied %	Species*	Entrance mode/ range	$\bar{x}$ depth to water [cm]	$\bar{x}$ total depth [cm]	$\bar{x}$ depth of water [cm]	Chimney #/ height [cm]	Plug # surface/ subsurface	Lateral #/ chamber #
HP	51	55	78.6	2 Pa 3 Oi 17 Ff	1/1-2	24.3	34.5	10.2	20/8.7	23/0	10/7
PP	0	-	-	-	-	-	-	-	-	-	-
PNP	40	100	42.5	17 Cp	1/1-3	63.3	81.8	18.5	19/4.4	17/1	15/27
TR	37	64.9	0.25	6 Cp	1/1-5	27.9	50.9	23.1	14/6.2	6/2	12/6
BBB	58	65.5	37.9	1 Cp 4 Cd 13 Ff 2 unk	1/1-4	65.8	140.5	74.7	45/7.4	20/0	3/2
SL	40	87.5	47.5	18 Cp 1 Cd	1/1-4	53.4	108.3	54.9	19/6.5	167/5	23/19
TS	40	85	52.5	1 Pa 20 Ff	1/1-5	55.5	60.6	5.1	34/7.8	4/4	11/14
BFB	40	85	37.5	12 Cd 3 Ff	2/1-6	95.2	108.2	13	34/11.9	26/7	15/8
FT	47	78.7	40.4	11 Cp 8 Cd	1/1-4	51.6	76	24.4	18/6.8	11/6	17/21
All sites	353	76.4	53.2	3 Pa 3 Oi 53 Cp 26 Cd 54 Ff		51.4	79.3	27.9	14.3	150/25	106/ 104

* Pa = *Procambarus acutus*, Oi = *Orconectes immunis*, Ff = *Fallicambarus fodiens*, Cp = *Cambarus polychromatus*, and Cd = *Cambarus diogenes*. Note: *Procambarus acutus* and *Orconectes immunis*, whereas found in burrows, are not primary burrowing crayfish.

Cambarus polychromatus (100%). Burrows had 1, 2, or 3 entrances (mode = 1). Average depth to water was 63.3 cm, average total burrow depth was 81.8 cm and average water depth was 18.5 cm. Nineteen burrows had chimneys of 4.4 cm average height. Seventeen burrows had plugged entrances. One of the plugs was sub-surface. Fifteen burrows had lateral tunnels extending from the main burrow tunnel and 27 burrows had enlarged chambers at their bottom.

Turkey Run: Thirty-seven burrows were examined at this location, 13 (35.1%) were inactive and 24 (64.9%) were active. Six, or 25%, of the active burrows were found to have crayfish in them, all were *Cambarus polychromatus* (100%). Burrows had up to 5 entrances (mode 1). Average depth to water was 27.9 cm, average total burrow depth was 50.9 cm and average water depth was 23.1 cm. Forteen burrows had chimneys of 6.2 cm average height. Six burrows had plugged entrances. Two of the plugs were sub-surface. Twelve burrows had lateral tunnels extending from the main burrow tunnel and 6 burrows had enlarged chambers at their bottom.

Beanblossom Bottom: Fifty-eight burrows were examined at this location, 20 (34.5%) were judged inactive and 38 (65.5%) active. Twenty of the active burrows were found to have crayfish in them along with 2 of the inactive burrows making a total occupation of 37.9%. One *Cambarus polychromatus*, 13 *Fallicambarus fodiens*, 4 *Cambarus diogenes*, and 2 unknown crayfish occupied the burrows. Burrows had 1 to 4 entrances (mode = 1). Average depth to water was 65.8 cm, average total burrow depth was 140.5 cm and average water depth was 74.7 cm. Forty-five burrows had chimneys of 7.4 cm average height. Twenty-five burrows had plugged entrances. None of the plugs were sub-surface. Only 3 burrows had lateral tunnels extending from the main burrow tunnel and only 2 had enlarged chambers at their bottom. This site had the deepest average total burrow depth. The water table in the area had been lowered by channelization of the associated stream and may have been effecting total burrow depth.

Summit Lake: Forty burrows were examined at this location, 5 (12.5%) were judged inactive and 35 (87.5%) active. Eighteen of the active burrows were found to have crayfish in them along with 1 of the inactive burrows making a total occupation of 47.5%. One *Cambarus diogenes*, and 18 *Cambarus polychromatus*, occupied the burrows. Burrows had 1 to 4 entrances (mode = 1). Average depth to water was 53.4 cm, average total burrow depth was 108.3 cm and average water depth was 54.9 cm. Nineteen burrows had chimneys of 6.5 cm average height. Sixteen burrows had plugged entrances. Five burrows had sub-surface plugs. Twenty-three burrows had lateral tunnels extending from the main burrow tunnel and 19 had enlarged chambers at their bottom.

Twin Swamps: Forty burrows were examined at this location, 6 (15.0%) were judged inactive and 34 (85.0%) active. Twenty-one of the active burrows were found to have crayfish in them and none of the inactive burrows making a total occupation of 52.5%. One *Procambarus acutus*, and 20 *Fallicambarus fodiens*, occupied the burrows. Burrows had up to 5 entrances (mode = 1). Average depth to water was 55.5 cm, average total burrow depth was 60.6 cm and average water depth was 5.1 cm. Thirty-four burrows had chimneys of 7.8 cm average height. Four burrows had plugged entrances. Four burrows had sub-surface plugs. Eleven burrows had lateral tunnels extending from the main burrow tunnel and 14 had enlarged chambers at their bottom. This site had the shallowest average water depth.

Bloomfield Barrens: Forty burrows were examined at this location, 6 (15.0%) were judged inactive and 34 (85.0%) active. Forteen of the active burrows were found to have crayfish in them plus one of the inactive burrows making a total occupation of 37.5%. Twelve *Cambarus diogenes*, and 3 *Fallicambarus fodiens*, occupied the burrows. Burrows had up to 6 entrances (mode = 2). Average depth to water was 95.2 cm, average total burrow depth was 108.2 cm and average water depth was 13.0 cm. Thirty-four burrows had chimneys of 11.9 cm average height. Twenty-six burrows had plugged entrances. Seven burrows had sub-surface plugs. Fifteen burrows had lateral tunnels extending from the main burrow tunnel and 8 had enlarged chambers at their bottom. This site had the greatest average depth to water.

Falling Timber: Forty-seven burrows were examined at this location, 10 (22.3%) were judged inactive and 37 (78.7%) active. Seventeen of the active burrows plus two of the inactive burrows were found to have crayfish in them making a total occupation of 40.4%. Eight *Cambarus diogenes*, and 11 *Cambarus polychromatus*, occupied the burrows. Burrows had up to 4 entrances (mode = 1). Average depth to water was 51.6 cm, average total burrow depth was 76.0 cm and average water depth was 24.4 cm. Eighteen burrows had chimneys of 6.8 cm average height. Eleven burrows had plugged entrances. Six burrows had sub-surface plugs. Seventeen burrows had lateral tunnels extending from the main burrow tunnel and 21 had enlarged chambers at their bottom.

Overall numbers for the 9 sites combined are: 76.4% active (269); burrow occupants: 3 *Procambarus acutus*, 3 *Orconectes immunis*, 26 *Cambarus diogenes*, 53 *Cambarus polychromatus*, 54 *Fallicambarus fodiens* (141 individuals); average chimney height 14.3 cm (201 chimneys); 150 surface plugs; 25 sub-surface plugs; average depth to water 51.4 cm; average burrow depth 79.3 cm; average water depth 27.9 cm; burrows with lateral tunnels 106; burrows with chambers 104.

Species-specific attributes

Only 3 of the 5 species encountered in this portion of the study had sufficient individuals present to warrant an analysis of their burrow traits (Table C-2).

***Fallicambarus fodiens*:** This species was the most commonly encountered crayfish in the study. It is interesting to note that in the statewide base study this species was one of the least common. It is believed that this dichotomy is due to the fact that the Burrow Ecology portion of the study was focused on least disturbed areas while the statewide base study included sites at all levels of disturbance. Fifty-four burrows were found to harbor the species. They averaged 1.5 entrances per burrow, 90.7% had chimneys of an average height of 7.2 cm, 77.8% were plugged at the surface while only 3 were plugged below the surface, 35.2% had lateral tunnels and 22.2% had chambers at the bottom of their burrow. Average burrow depth was 73.4 cm and average depth to water was 46.4 cm. The average water depth in the burrows was 25.8 cm though 29.4% had no water in them.

Table C-2. Summary of burrow morphological characteristics by species.

Species	# of individuals	$\bar{x}$ entrance diameter [cm]	% chimneys	$\bar{x}$ chimney height [cm]	% with plugs	% with laterals	% with chambers	total depth [cm]	depth to water [cm]	depth of water [cm]	% without water
C. polychromatus	53	1.9	62.3	5.9	52.8	58.0	60.0	88.1	42.6	45.5	0.06
C. diogenes	26	2.1	76.9	11.8	38.5	38.5	30.8	120.8	75.5	42.1	19.20
F. fodiens	54	1.5	90.7	7.2	77.8	35.2	22.2	73.4	46.4	25.8	29.40

***Cambarus polychromatus*:** Fifty-three burrows were found to harbor this species. They averaged 1.9 entrances per burrow, 62.3% had chimneys of an average height of 5.9 cm, 52.8% were plugged at the surface while only 2 were plugged below the surface, 58.0% had lateral tunnels and 60.0% had chambers at the bottom of their burrow. Average burrow depth was 88.1 cm and average depth to water was 42.6 cm. The average water depth in the burrows was 45.5 cm and only 3 (0.06%) had no water in them.

***Cambarus diogenes*:** Twenty-six burrows were found to harbor this species. They averaged 2.1 entrances per burrow, 76.9% had chimneys of an average height of 11.8 cm, 38.5% were plugged at the surface while only 1 was plugged below the surface, 38.5% had lateral tunnels and 30.8% had chambers at the bottom of their burrow. Average burrow depth was 120.8 cm and average depth to water was 75.5 cm. The average water depth in the burrows was 42.1 cm and 5 (19.2%) had no water in them.

Cambarus diogenes on average was the deepest burrowing species, and least likely to plug it's entrance. It also had the highest average number of burrow entrances. *Cambarus polychromatus* was most likely to have lateral tunnels and a chamber at the bottom of its burrow and *Fallicambarus fodiens* had chimneys on almost all of its burrow entrances, was most likely to plug its burrow, and was most likely to not have water in its burrow.

General observations

Burrow fidelity: Because of the problems reported previously and the consequences of extracting a crayfish from its burrow by hand no conclusions can be made concerning burrow fidelity in this portion of the study. It was deemed more important to determine the species, size, and sex of a resident crayfish than to obtain information on burrow fidelity. It can be stated that for those burrows in which a resident crayfish was identified with the burrow scope and the individual not extracted, 100% of those burrows continued to be occupied by a crayfish. It cannot be stated that the occupying crayfish was the same one as previously observed though. In conclusion, the question of burrow fidelity could not be satisfactorily addressed by this portion of the study. It is best addressed in the Demographics section of this report.

Burrow morphology/crayfish occupant relationships: Examination of the relationship between crayfish size as measured by carapace length and the size of a burrow's diameter shows a relationship between the two though it was somewhat weak (Figs. C-7 - C-10) with $R^2 < 0.60$. These results support the observations reported in the Demographics portion of this report in which crayfish were reported to have low burrow fidelity.

An examination of burrow characteristics using Cluster Analysis (Fig. C-11) shows that burrow depth, water depth, depth to water, entrance diameter, carapace

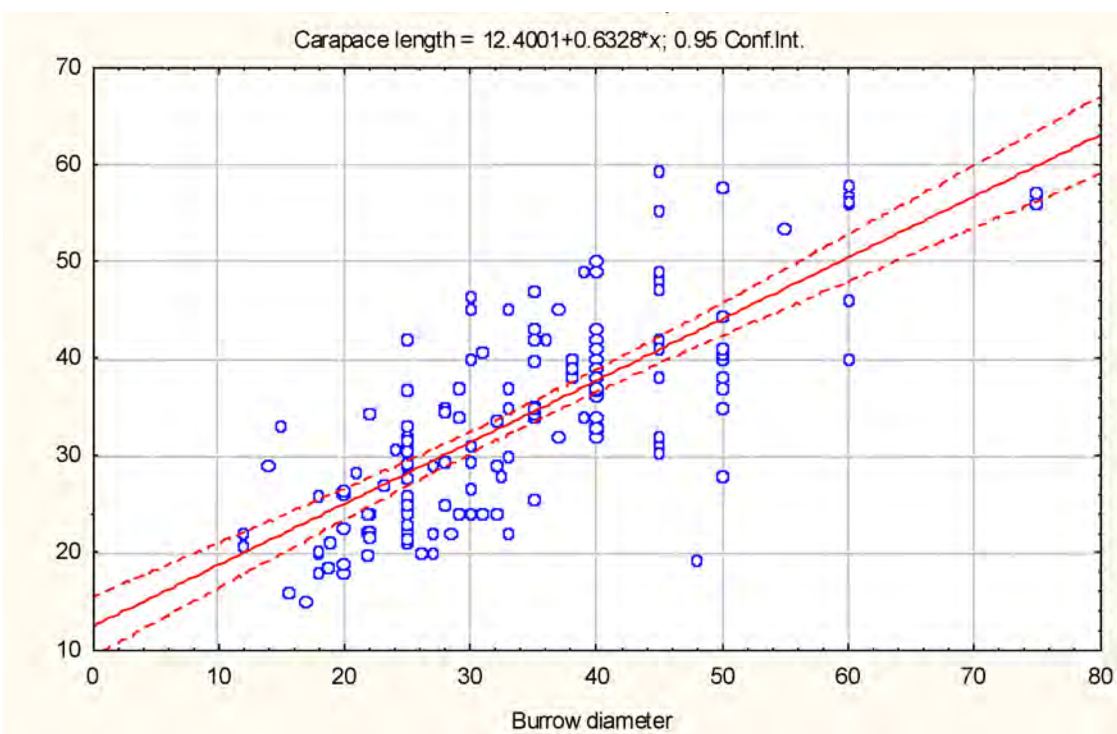

Figure C-7. Regression analysis of *Cambarus diogenes*, *Cambarus polychromatus*, and *Fallicambarus fodiens* carapace length to diameter of burrow occupied.

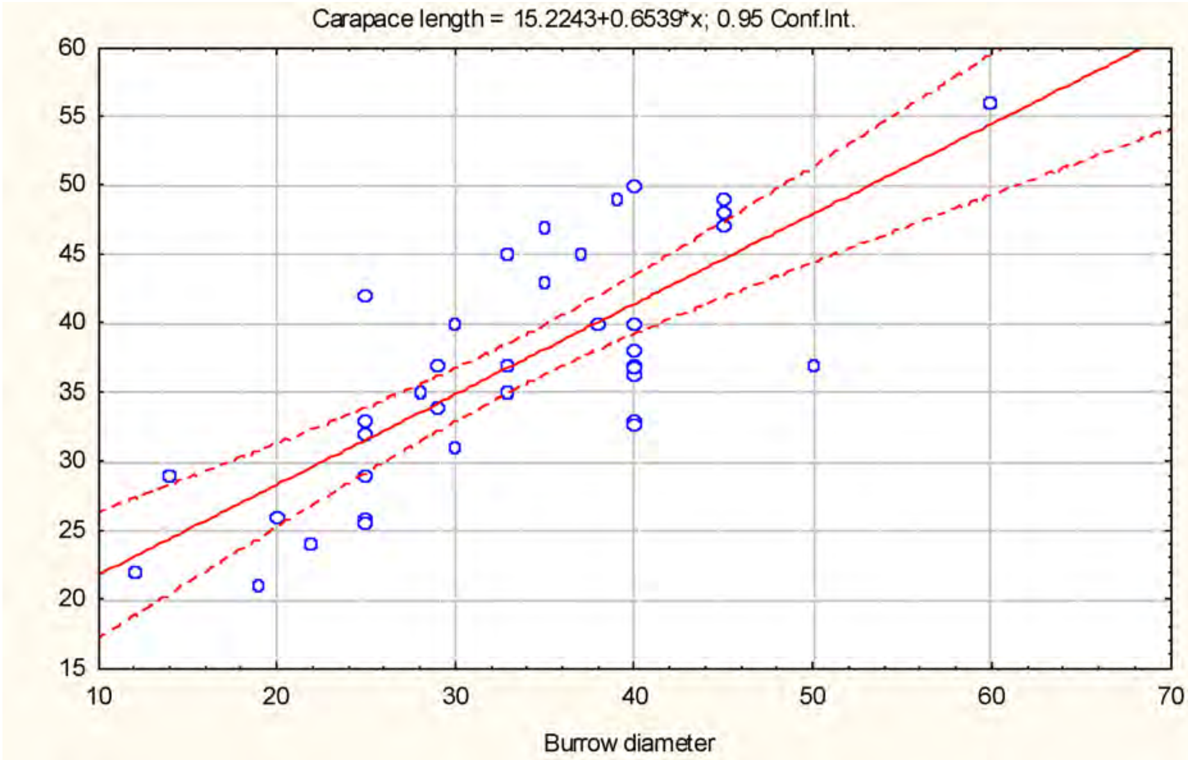

Figure C-8. Regression analysis of *Cambarus diogenes* carapace length to diameter of burrow occupied.

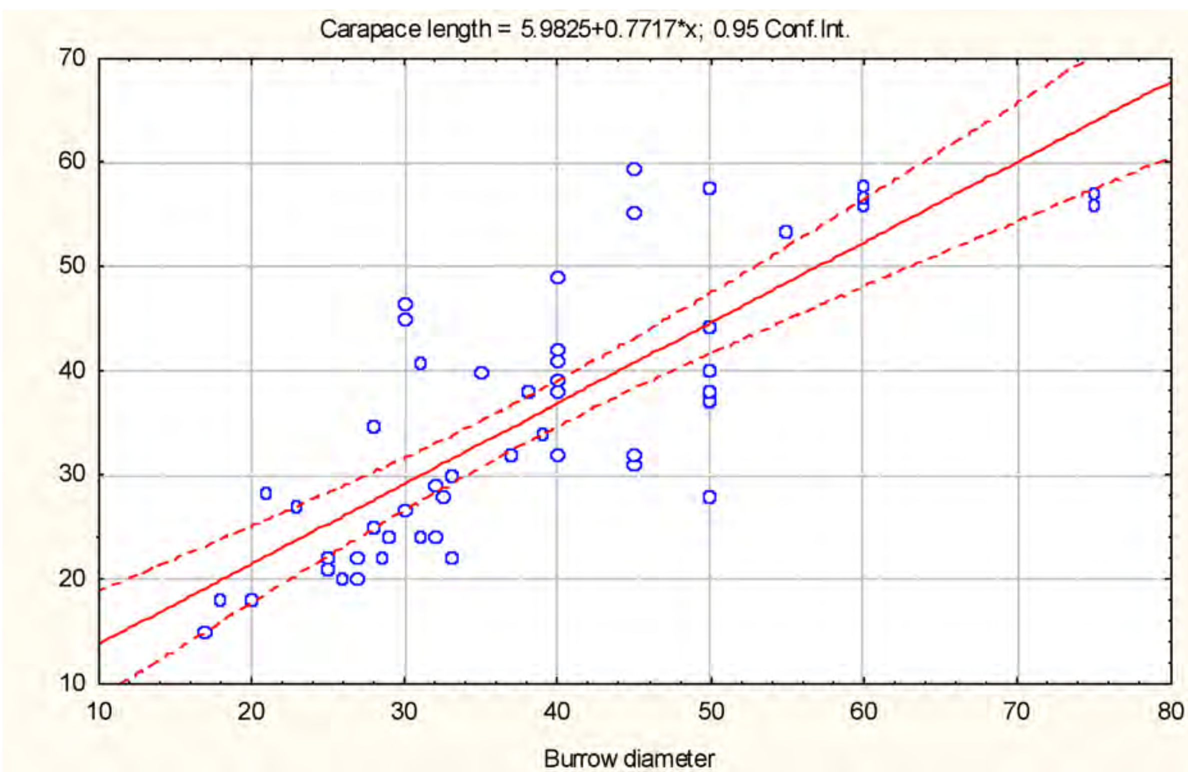

Figure C-9. Regression analysis of *Cambarus polychromatus* carapace length to diameter of burrow occupied.

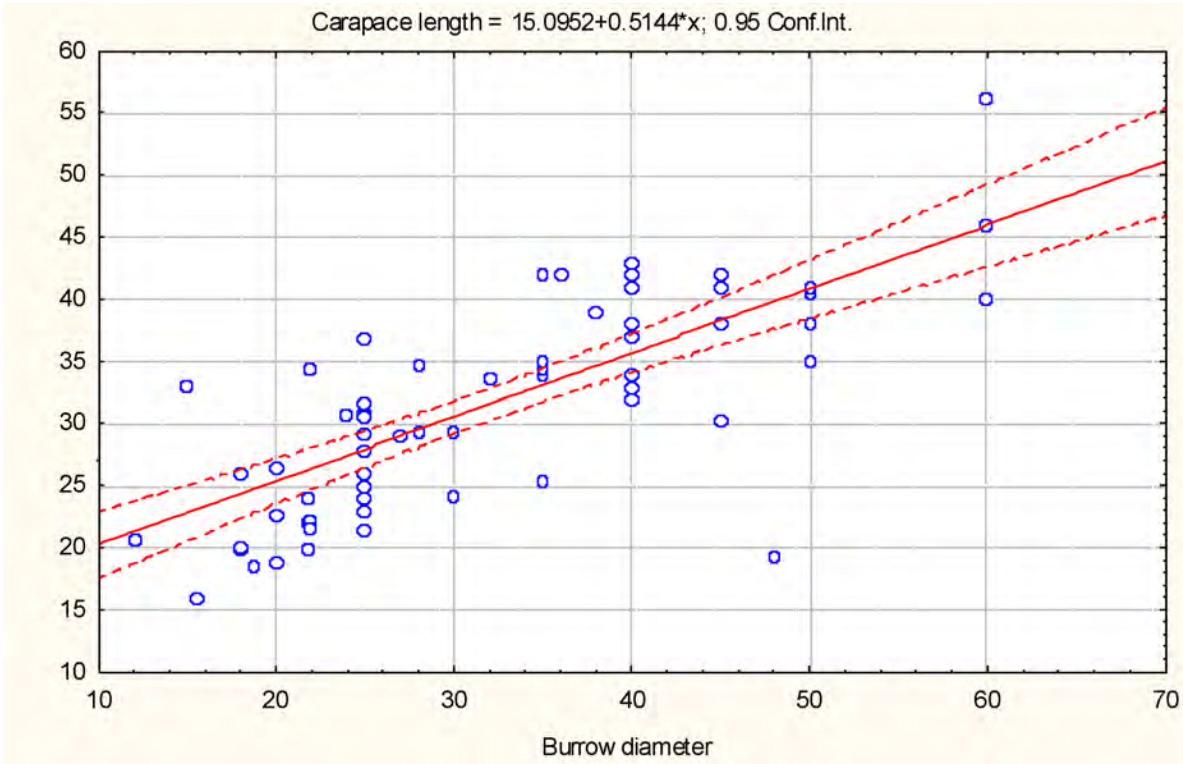

Figure C-10. Regression analysis of *Fallicambarus fodiens* carapace length to diameter of burrow occupied.

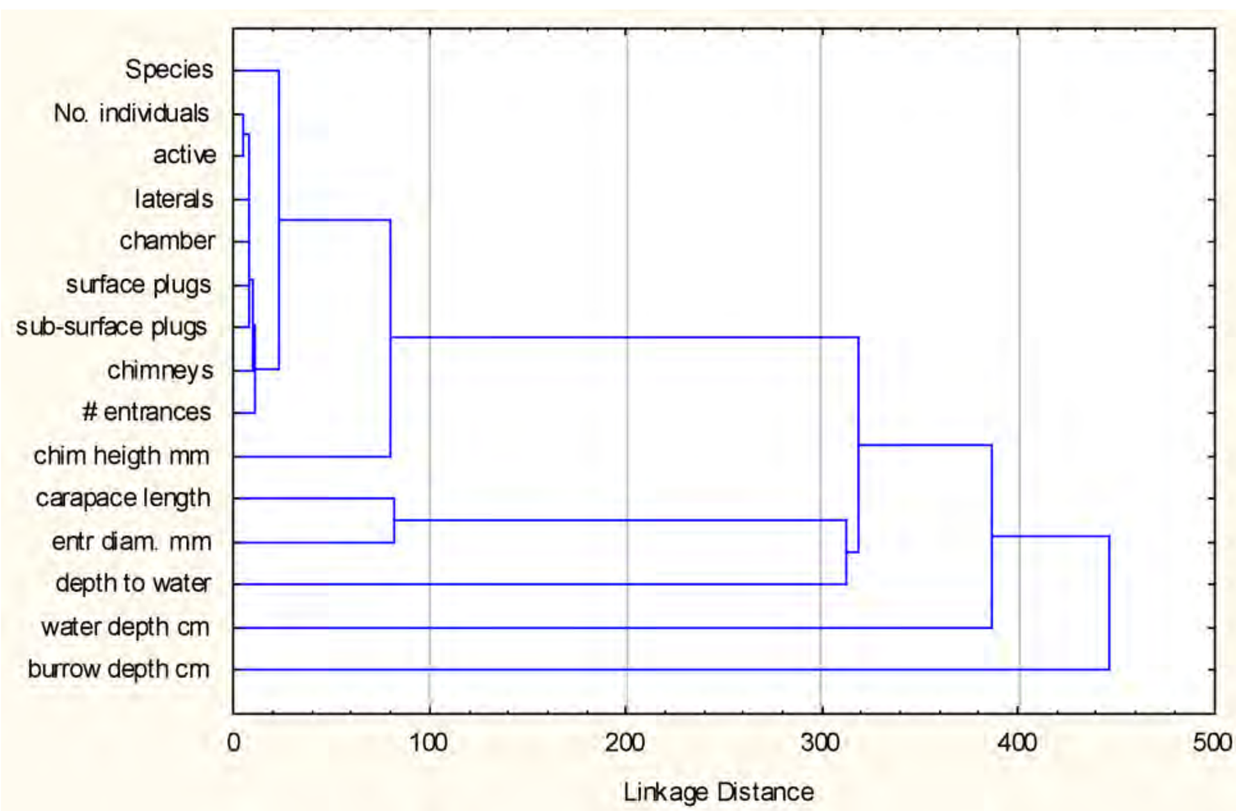

Figure C-11. Cluster analysis of burrow characteristics and species using 15 burrow variables [single linkage and Euclidean distance method].

length, and chimney height form a loosely associated group. Within that group entrance diameter and carapace length have the closest relationship. All six of these variables are measurements. Number of individuals, active/inactive, # laterals, chamber presence, # surface plugs, sub-surface plug, # chimneys, and # of entrances formed a second cluster. These eight variables were all counts. Species was most closely associate with the second cluster. The overall indication of these analyses is that burrow morphology is not governed by species and that diameter of burrow entrance shows a loose relationship to crayfish size.

Burrow depth/crayfish size: An in-the-field observation concerning a relationship between crayfish size and the depth of an individual's burrow was discussed previously in the Base Study section of this report. The data collected in the Burrow Ecology study was used to examine this potential relationship. As with the crayfish size/ burrow diameter relationships, a loose relationship (Fig. C-12) was seen in the available data ($r^2 = 0.38$). Though the depth of a crayfish burrow can not be accurately predicted from the size of a crayfish, there is some relationship between crayfish size and burrow depth that indicates, with all other things being equal, a larger crayfish is likely to dig a deeper burrow. This of course would be strongly mediated by the depth of the local water table.

Burrow plugs: The plugging of burrows by occupying crayfish has the possibility of being prompted by several factors. The most immediate factor could be a response to drought conditions and a need to preserve moisture. Crayfish also have been observed to seek shelter when molting (a vulnerable stage of life history), and plugging the burrow entrance may be done as a defense measure. Finally, it has been reported that several vertebrate species may hibernate in crayfish burrows and crayfish may plug their burrows in the fall to prevent the entrance of such individuals. There was only one freshly molted crayfish observed from all of the burrows examined in the Burrow Ecology study. Its burrow had one entrance that was plugged. All other plugged burrows had crayfish with fully hardened exoskeletons or no crayfish at all. A statistical analysis of the month a burrow was examined and its likelihood of being plugged revealed no significant differences for all burrows examined during the 4 months (May, June, July, & Sept.) this study was conducted though June had the highest frequency of burrows being plugged (Fig. C-13). Examination of those burrows that lacked crayfish in them also showed no significant differences between months with June tending to more frequently have plugs present. The June trend was reliant on only one site visit during which only *C. polychromatus* was observed (Potowatami State Nat. Preserve).

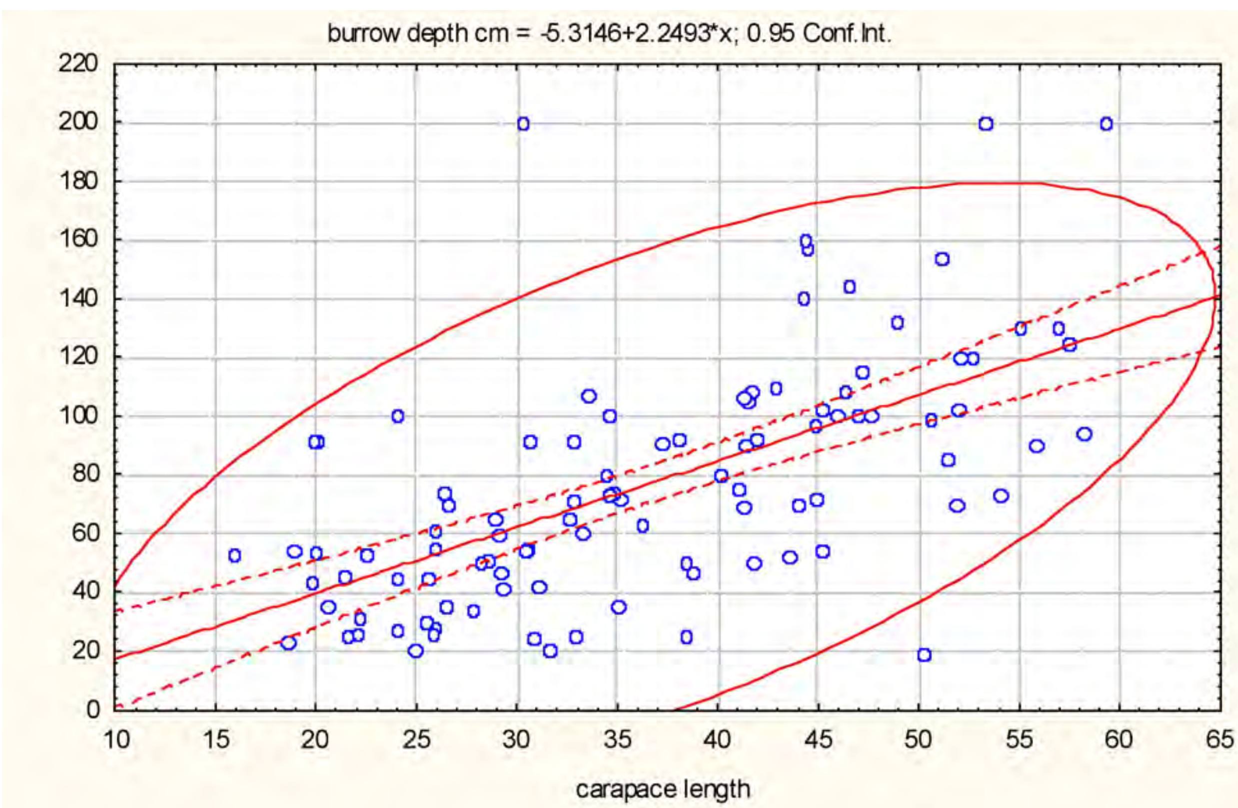

Figure C-12. Regression analysis of crayfish carapace length and burrow depth. Middle line = regression line, two bordering lines = 95th confidence interval, and ellipse = 95th confidence interval of coefficients.

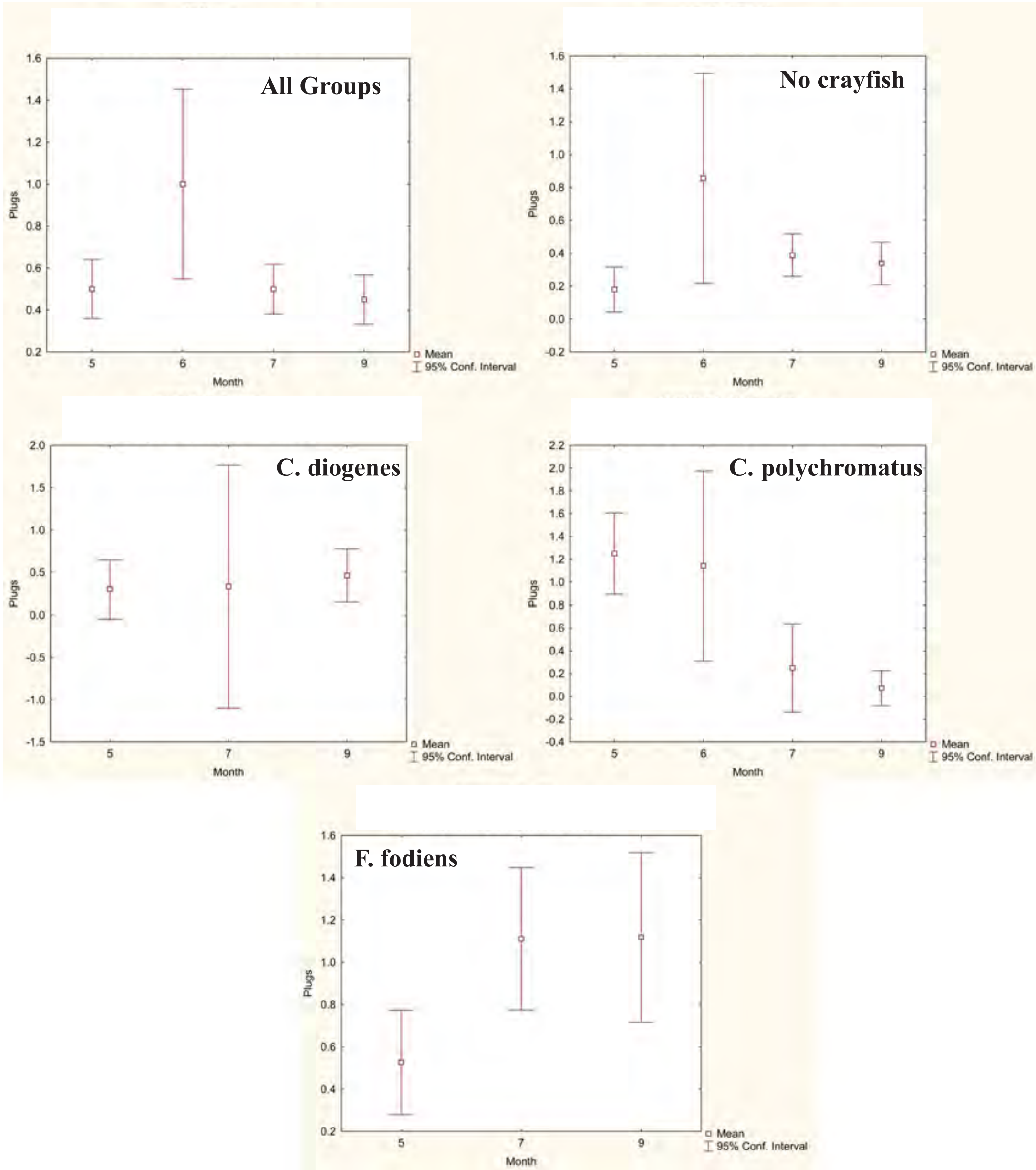

Figure C - 13. Monthly comparison of plugged burrow incidence by month of observation, showing mean and 95% confidence interval. Upper left - all burrows observed, upper right - burrows not found to have crayfish present, mid left - burrows with *C. diogenes* present, mid right - burrows with *C. polychromatus* present, bottom - burrows with *F. fodiens* present.

Examination of the data by species revealed an individual pattern for each species. *Cambarus diogenes* displayed no differences over the sampling season, *C. polychromatus* was significantly more likely to have plugged burrows in May and June than in July and September, and *F. fodiens* was significantly more likely to have open burrows in May and plugged burrows in July and September. It is thought that the observed differences are related to each species' life style. Unlike *C. polychromatus, F. fodiens* is never found at the mouth of its burrow and has not been observed to act as a predator thus plugging its burrow during non mating periods could be less of a problem. It was observed during this study that individuals of *Fallicambarus fodiens* extracted from their burrows were in a near catatonic state. The species may be active only in the spring and spend the rest of the year estivating. A thorough life history of this species should be conducted.

Why *C. polychromatus* would have its burrows plugged in early summer and spring is not clear. Its plugging behavior could be related to molting or reproduction in spring, but neither of these possibilities are clearly indicated by the data. This species, when extracted from its burrow, was quite active and aggressive at all times encountered. Thoma *et al*. (2005) reported that this species frequently is found at the mouth of its burrow, where it is apparently waiting for prey. This behavior is likely related to its burrow plugging activity.

The ratio of active to inactive burrows was found in this study to be biased in favor of active burrows. Several factors appear to play into this phenomenon. First, inactive burrows are likely harder to find as they may be obscured by falling leaf litter or overgrown by adjacent vegetation. Active burrows were decidedly easier to locate since the occupying crayfish appeared to maintain the area around its burrow. It is also clear that there are more active burrows than occupied burrows. This is in part due to the movement of crayfish between burrows. A burrow may not have an occupant but could have recently been maintained by a visiting crayfish that has moved to another burrow.

It is interesting to note that crayfish colonies in pastured areas tended to show low abundance. It may be that the trampling of burrows by horses and cattle, which covers up or eliminates burrow entrances, serves to depress burrowing crayfish abundance by trapping crayfish in burrows or reducing the number of burrows a crayfish may encounter while on the surface thus making it more susceptible to predation.

Burrow co-inhabitants
(Table C-4 [Appendix], Figs. C-14 - C-17)
Over 38,635 individual organisms from the 353 burrows (ave. 109 individuals per burrow) were recorded during this study. Forty-one burrows had more individuals (all microcrutaceans) than could be feasibly counted (over 1,000). The organisms were from 50 Families, in 36 Orders in 10 Classes that were classified into 165 organism "types". The Class Insecta harbored the greatest diversity (19 Orders, 29 Families) followed by Crustacea (7 Orders, 10 Families). All forms of life stages were found; i.e. eggs, larvae, pupae, juveniles, adults and gravid adults. The microcrustacea comprised 91.9% (35,503) of the individuals recorded from crayfish burrows. Insects numbered 1,448 (3.7%), followed by Nematodes 592, Mollusk 519, Annelids 321, and Arachnids 178. The remaining 4 Classes comprise only 0.2% (74 individuals) of the collections. These numbers are somewhat skewed in favor of the non-crustacean groups since 41 microcrustacean collections were under-counted.

It is thought that most of the taxa encountered in crayfish burrows during this work were primarily soil layer organisms that were incidentally in the burrows. The principle organism group that appears to be utilizing crayfish burrows, as a primary habitat, is the

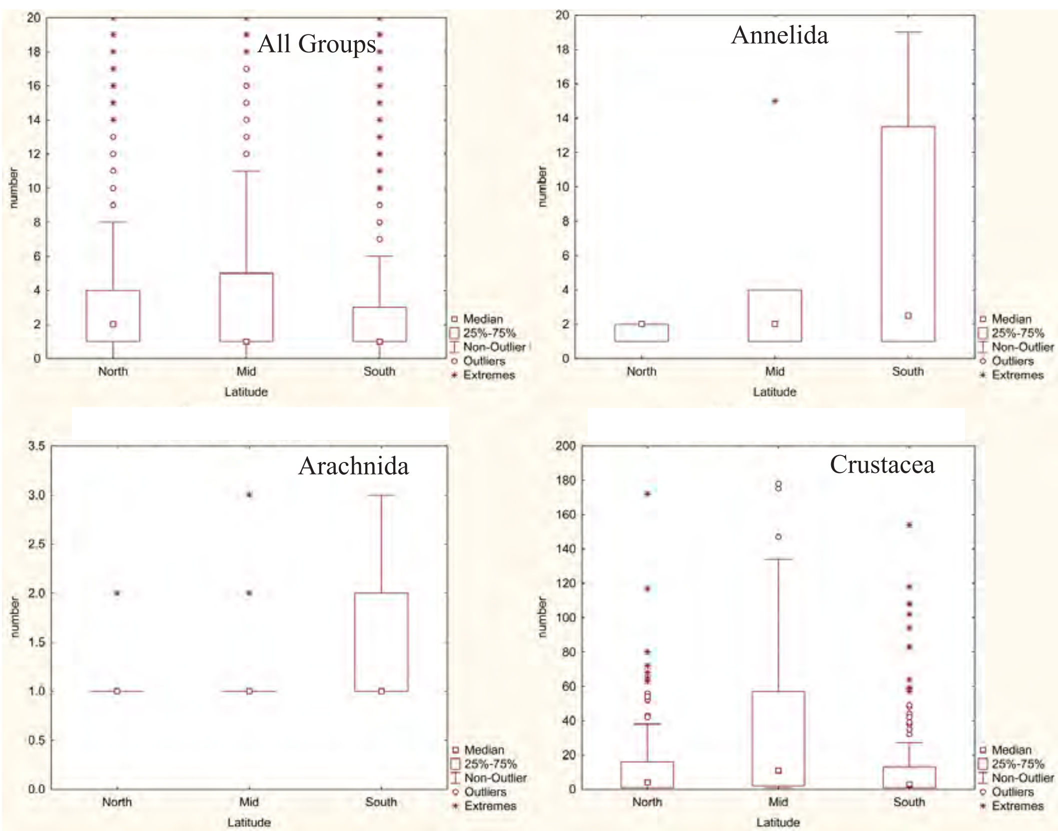

Figure C-14. Box and Whisker plots of burrow co-inhabitants by location in the north, south, or mid state. Upper left - abundance of all organism types by location, upper right - abundance by location of Annelida, lower left - abundance by location of Arachnida, lower right - abundance by location of Crustacea.

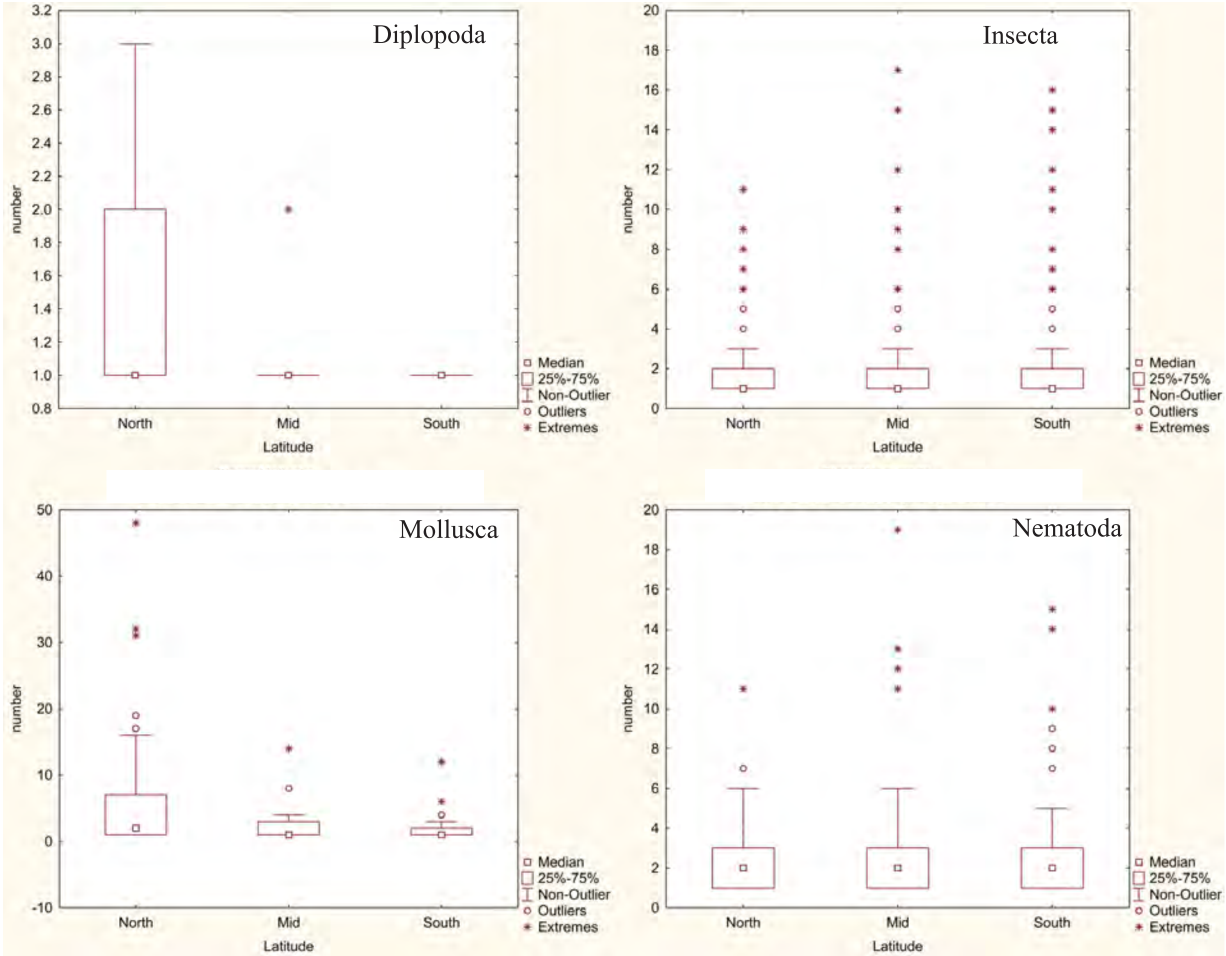

Figure C-15. Box and Whisker plots of burrow co-inhabitants by location in the north, south, or mid state. Upper left - abundance by location of Diplopoda, upper right - abundance by location of Insecta, lower left - abundance by location of Mollusca, lower right - abundance by location of Nematoda.

microcrustaceans. It may be that there is a commensal relationship between burrowing crayfish and their microcrustacean fauna. In North America, Enterocytherid ostracods are known to exist only on crayfish (Hart and Hart 1969). Only a small number (191 individuals) of Enterocytherid ostracods were recorded in this study though. Another crayfish commensal group recorded was Branchiobdellidae which comprised 300 (93.5%) of the 321 Annelida recorded. It is speculated that the microcrustacea may serve to keep burrow waters clean or that they may provide a food source for young of year crayfish still living with their mother. It is likely that crayfish moving from burrow to burrow carry the microcrustaceans with them possibly in their gill chamber or that the microcrustacea may lay their eggs on the crayfish's carapace and transport them that way.

Burrowing crayfish may benefit from the presence of microcrustaceans in thier burrows in two ways: microcrustaceans may reduce anoxia in burrow water by consumming organic and microbial matter thus reducing oxigen demand; and, microcrustaceans may provide an initial food source for the earliest stages of crayfish young. Microcrustaceans in turn, benefit in having additional habitats to exploit.

In addition to the microcrustaceans, the larvae of the insect groups Odonata (dragonflies) and Diptera (midges) are obligate aquatic organisms not contributed from surrounding soil organism populations. It is not certain that these insect larvae were obligate crayfish burrow inhabitants. The odonate species identified are not crayfish burrow obligates (Glotzhober and McShaffrey, 2002). For chironomid species, identification to species would be needed to answer this question. Many chironomid species are known to be habitat specialist in their larval stages. All dragonflies captured during this study were identified to species, especially given the concern for Hienes Emerald Dragonflies (*Somatochlora hineana*). Two species were mature enough to be identified by Dr. Bob Glozhobber of The Ohio Historical Society, a Gray Petaltail (*Tachopteryx thoreyi*) from the burrow

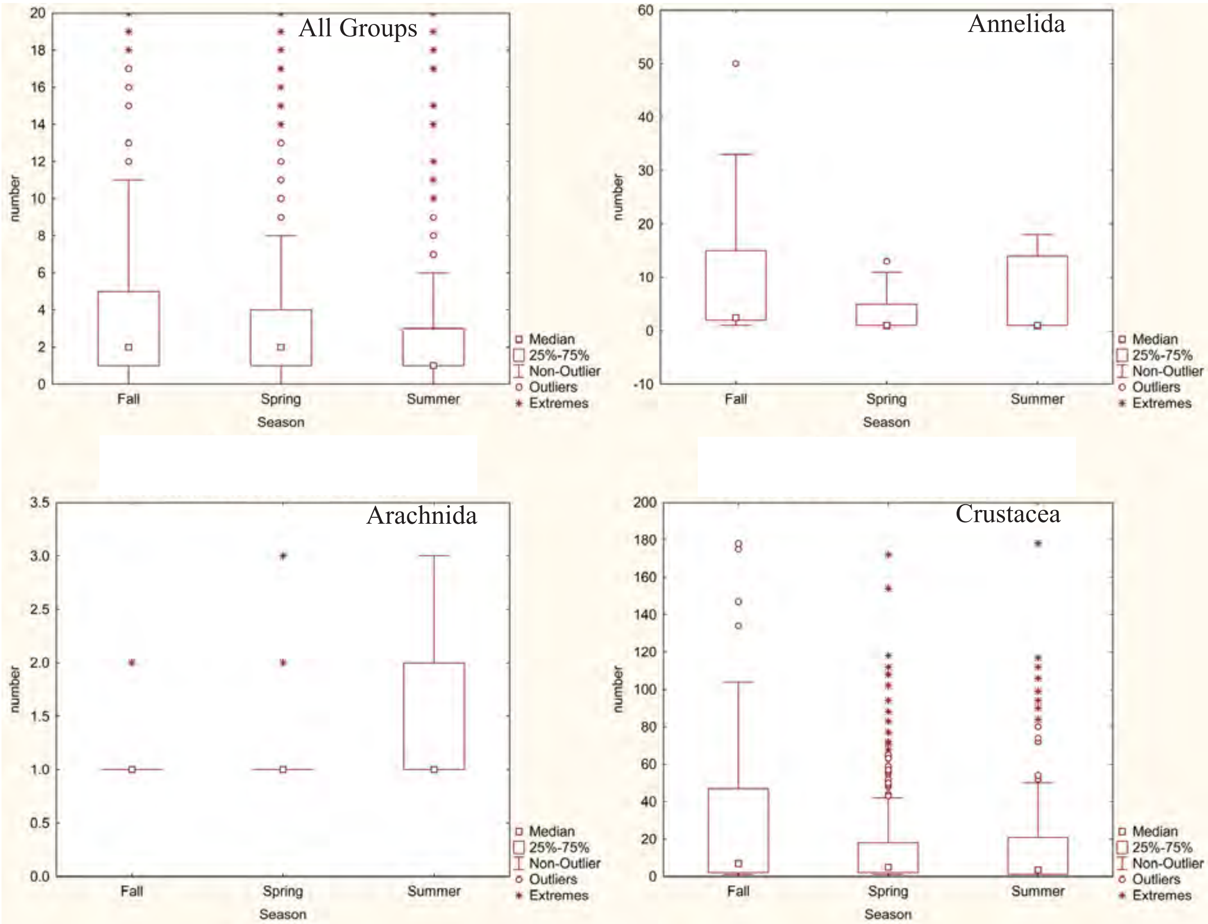

Figure C-16. Box and Whisker plots of burrow co-inhabitants by season. Upper left - abundance of all organism types by season, upper right - abundance by season of Annelida, lower left - abundance by season of Arachnida, lower right - abundance by season of Crustacea.

ecology study and an Eastern Pondhawk (*Erythemis simpliciocollis*) from the base study. Two very small larvae that were not seen amongst the plant litter were accidently preserved and were too small to identify to species. Interestingly, all dragonflies collected during the burrow ecology study came from the spring fed burrows at Turkey Run.

When burrow co-inhabitants are examined for general representation by crayfish species occupying the burrow, only one difference is seen. None of the burrows occupied by *Cambarus polychromatus* were found to have Annelida in them. This is not an indication that *C. polychromatus* does not have Branchiobdellids on them, they indeed do. It is not known why burrows of *Cambarus polychromatus* should lack Annelida. All three species considered herein, otherwise had similar proportions of organism groups. Strong differences are observed when examining abundance of organisms associated with the three species though. Although *Fallicambarus fodiens* was most common, it had the lowest number of individuals and the least number of organism types per burrow (average 32.5/burrow). This may be due to the fact that 29.4% of its burrows lacked water. *Cambarus diogenes* and *Cambarus polychromatus* each had an average of 234.5 and 112.3 organism types per burrow, respectively. Because *Cambarus diogenes* was more likely to have microcrustaceans in its burrows, it had a greater density of individuals per burrow.

Latitudinal differences: Little difference between northern and southern sites was observed. Figures C-14 and C-15 show box and whisker plots for those classes of organism groups abundant enough to analyze. None of the classes were found to differ significantly between north, mid, and south Indiana. More members of the class Diplopoda were found at northern sites (primarily Hoosier Prairie) than in southern and mid-state. Overall numbers for Diplopoda were very low (1 per burrow). At southern sites arachnid and annelid numbers showed a

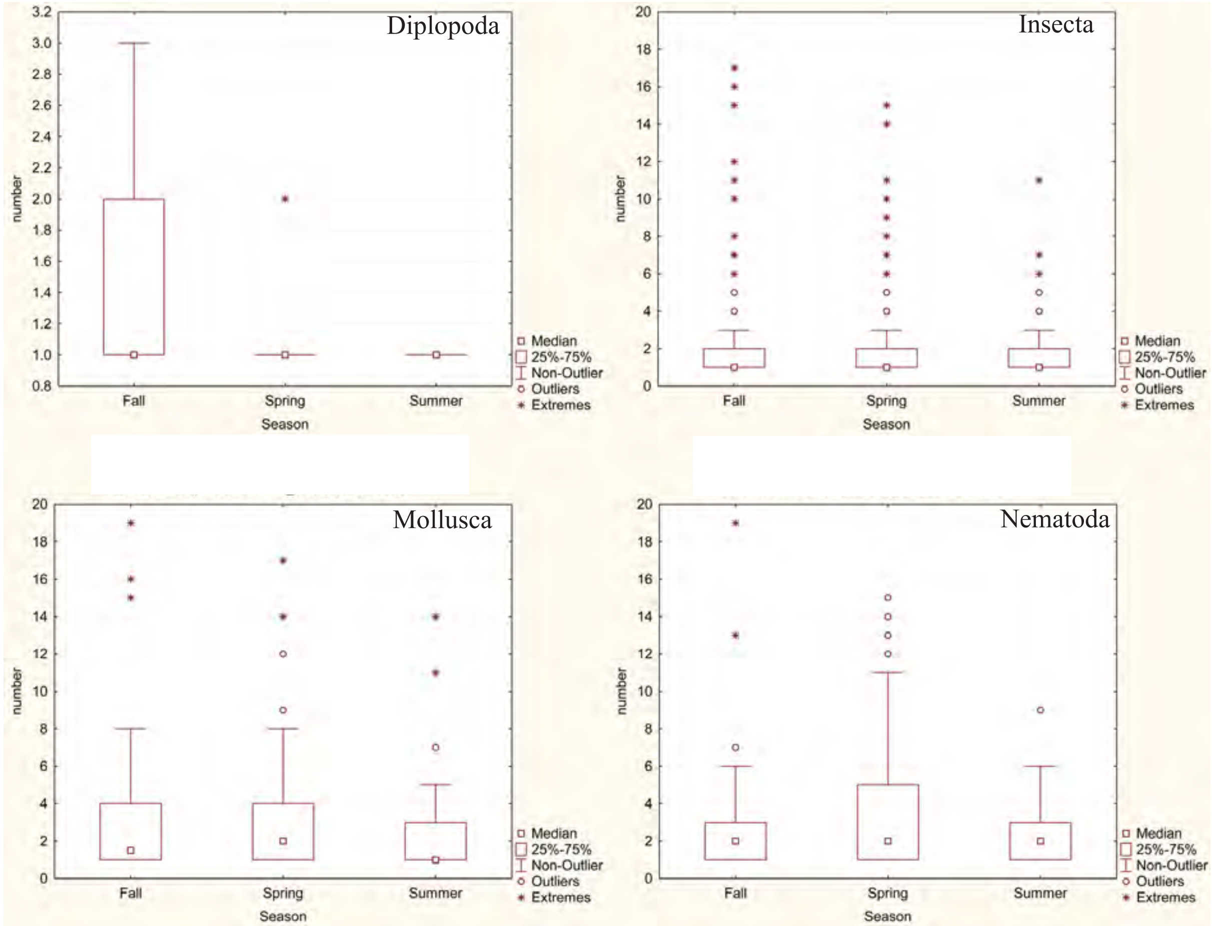

Figure C-17. Box and Whisker plots of burrow co-inhabitants by season. Upper left - abundance by season of Diplopoda, upper right - abundance by season of Insecta, lower left - abundance by season of Mollusca, lower right - abundance by season of Nematoda.

slightly higher level. Again, numbers were very low and the average number per burrow was 1 or 2. The differences were not significant but the greater abundance is considered real.

Seasonal differences: As with north/south differences, little difference was found in the data (Figs. C-16 & 17). Data were separated as spring, summer, and fall samples. The higher fall abundance of Diplopoda was the result of a higher incidence of diplopods at Turkey Run during the fall sample run. The higher abundance of arachnids during summer was the result of higher spider abundance at most of the sites sampled so it is believed that this difference was real though not statistically different.

It is believed that crayfish burrows are insulated from the surface environment, have a relatively constant temperature and humidity, and usually have a constant pool of water at their bottom. This is likely the principle reason for the fairly consistent results for both seasonal and latitudinal considerations. As illustrated by diplopod and arachnid results, variations in surface conditions and organism groups and abundance can be reflected in the burrow community.

Conclusions

None of the burrow morphology characteristics proved to be unique to any of the three species analyzed. Structurally, *Cambarus polychromatus* tended to have the most intricate burrows and *Fallicambarus fodiens* the least, though they were not found to be significantly different. *Fallicambarus fodiens* was most likely to have chimneys at its burrow entrances. Crayfish size was found to be loosely associated with burrow diameter. This is believed to indicate movement of individual crayfish amongst burrows in an area. A weak relationship between burrow diameter and total burrow depth was found. It is interpreted from this that larger crayfish are more capable of burrowing in areas where water tables are further from the surface though they may still burrow in areas with water tables near the surface.

Three species of crayfish were found frequently enough to prove feasible for assessment in this study. They were *Cambarus diogenes, Cambarus polychromatus,* and *Fallicambarus fodiens*. *Fallicambarus fodiens* and *Cambarus polychromatus* were most frequently encountered. *Fallicambarus fodiens* had the fewest co-inhabitants per burrow and *Cambarus diogenes* the most.

It is obvious that crayfish burrows harbor an ecosystem dominated by microcrustaceans. Numerous invertebrates (mostly insects) associated with the surrounding soil layers also occurred in the burrows. Due to our current inability to identify all the numerous microcrustaceans to species, it is not possible to state if there were any species that were obligate inhabitants of crayfish burrows. This is especially unfortunate given the fact that crayfish have been observed in the literature to have commensal relationships with Enterocytherid ostracods which are only found on crayfish. It is difficult to envision that the microcrustaceans inhabiting crayfish burrows are all the same as those found in nearby surface waters if present.

Obligate aquatic life stages of dragonfly and midge larvae were found in some burrows. None of these, or the other taxa encountered in this study, are thought to be burrow obligates. Many were soil inhabitants. Seasonal and latitudinal differences were nonexistent or very slight. Spiders and mites did show a slight seasonal trend being more common in the summer and in the south.

Several vertebrate species have been reported in the literature to inhabit crayfish burrows (Curry 2001, Thompson 1915, Bailey 1945, Harding 2000, Maple and Orr 1968). None of the species reported to utilize burrows were observed in this study. One eastern garter snake (*Thamnophis sirtalis*) one wood frog (*Rana sylvatica*) and two leopard frogs (1 *Rana piipens*, 1 *Rana utricularia*) were the only vertebrate species observed in crayfish burrows in this portion of the study. All four individuals seemed to be attempting to evade the researchers. In addition two "mice" were observed in crayfish burrows during the base study portion of the research. It seems obvious that during the summer season, vertebrates are rarely utilizing crayfish burrows. A study of crayfish burrows using the minimally invasive burrow scope during known seasons of occupation in known areas of occurrence would be very informative for vertebrate species of special concern. Some questions related to burrow morphology and associated rare vertebrate species that come to mind (among others related to vertebrate species' occurence) are: In vertebrate hibernation areas, what is the burrow size, depth, distance from water, and depth of water? What crayfish species occur there? What are the external environmental conditions leading to occupancy and to departure from crayfish burrows?

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Annotated Bibliography

Annotated Bibliography

1. [Anonymous]. 1997. Mt. Arthur burrowing crayfish. Research Note - Forestry Tasmania (6): 1.

   Abstract: A very brief account is given of a survey undertaken to gather information on the distribution and management considerations for the Mt. Arthur burrowing crayfish (*Engaeus orramakunna*) in Tasmania, Australia. Some 55% of the species' distribution occurs in State forest. Habitat requirements and conservation status of the species are discussed. Existing provisions for streamside protection are considered adequate for the protection of the species.

2. Abbott CC. 1873. Notes on the habits of certain crawfish. American Naturalist 7(2): 80-84.

3. Acosta CA, Perry SA. 2001. Impact of hydropattern disturbance on crayfish population dynamics in the seasonal wetlands of Everglades National Park, USA. Aquatic Conservation 11(1): 45-57.

   Abstract: 1. The natural hydropattern in the seasonally-flooded marl prairie wetlands of Everglades National Park has been severely disrupted by human water control activities, seriously impacting higher trophic organisms, e.g. wading birds, that depend on these wetlands. Less is known about the impacts on key aquatic fauna, such as crayfish *Procambarus alleni*, or how these populations might respond to proposed habitat restoration strategies. 2. Under severe environmental stress, populations of burrowing crayfish are predicted to have skewed size structure, low reproductive success, low survival, and widespread dispersal. As predicted for populations in stressed habitats, crayfish density was low, small dispersing adults were dominant, juvenile abundance was low, and survival was low in habitats where the hydroperiod (duration of flooding) was short and groundwater level was lowest. 3. Crayfish dispersed during flooding, but during the drydown, they burrowed rather than sought deeper water. This dispersal strategy may be adaptive for surviving in seasonal wetlands, but this had severe consequences on survival in disturbed habitats with shortened hydroperiods. Survival in burrows during the dry season was high in the longer-hydroperiod habitats but was zero in the short-hydroperiod habitat where the groundwater level fell more than 1 m. 4. Long-hydroperiod marl prairie may function as sources, whereas short-hydroperiod habitats act as population sinks. Our study suggests that the threshold conditions for preventing mass mortality of crayfish in these wetlands are hydroperiods > 7 months and groundwater levels < 0.5 m below the surface during the dry season. 5. Historical (pre-drainage) hydroperiods appear to be restricted to the longest hydroperiod areas of the marl prairie. This indicates that much of the marl prairie wetlands now function as population sinks for crayfish and other invertebrates. The historical hydropatterns need to be re-established throughout the marl prairie wetlands to achieve the restoration goal of increasing productivity in the aquatic faunal community.

4. Acosta CA, Perry SA. 2002. Spatio-temporal variation in crayfish production in disturbed Marl Prairie marshes of the Florida Everglades. Journal of Freshwater Ecology 17(4): 641-650.

   Abstract: We used the burrowing crayfish *Procambarus alleni* as a model organism to compare spatial and temporal patterns of density, standing crop biomass, and size-structured productivity in the seasonal wetlands of the Florida Everglades where environmental stress has been exacerbated by hydropattern disturbance. Crayfish density was not linked to fluctuations in water temperature or dissolved oxygen and was only artifactually associated with water depth. Density and biomass within sites were similar over time but increased significantly in habitats with longer hydroperiods (duration of flooding). The effect of hydroperiod-associated habitat quality on annual crayfish production, in terms of size-structured growth and recruit production, was even more pronounced. Crayfish production in the long-hydroperiod sites was approximately two times greater than in medium-hydroperiod sites and five times greater than in short-hydroperiod sites. Turnover ratios (productivity:biomass) showed that the spatial trend in productivity consistently lagged density and biomass trends in the shorter hydroperiod habitat, indicative of population sink conditions. The long-hydroperiod sites were characterized by high productivity and appeared to function as population sources from which crayfish dispersed to nearby, often marginal, habitats. Therefore, the spatial extent and distribution of short-hydroperiod sink habitats significantly impacted crayfish density, population size structure, and productivity. Simple estimates of density or biomass that do not account for the influence of hydropattern on habitat quality may be misleading indicators of productivity because survival, growth, and reproductive output may vary substantially across disturbed landscapes.

5. Barbaresi S, Santini G, Tricarico E, Gherardi F. 2004. Ranging behavior of the invasive crayfish, *Procambarus clarkii* (Girard). Journal of Natural History 38(22): 2821-2832.

   Abstract: The spreading of the invasive crayfish *Procambarus clarkii* throughout the world is attributed to human introductions; however, the rapid and widespread diffusion of the species following its establishment is the result of its dispersal capabilities. This study aimed to provide further information for the comprehension of the invasive potential of this crayfish by underlining some aspects of its behavioral flexibility. Radio-telemetry was used to analyze locomotion, home-range faithfulness and dispersal of the species in an Italian irrigation ditch system. Space was used differently by the two sexes, females being more nomadic in their ranging behavior probably due to their reproductive phase. In addition, an inter-individual variability was found in both speed of locomotion and dispersal pattern. By applying a simulation model, it was shown that (1) both sexes disperse, and (2) ranging behavior is not the result of a passive dispersion, but that the occupancy of burrows may affect the rate of dispersion. Finally, an intra-individual variability is related to the occurrence of two spatial strategies within the same population.

6. Barbaresi S, Tricarico E, Gherardi F. 2004. Factors inducing the intense burrowing activity of the Red-Swamp crayfish, *Procambarus clarkii*, an invasive species. Naturwissenschaften 91(7): 342-345.

   Abstract: The burrowing activity of the invasive red-swamp crayfish, *Procambarus clarkii*, was studied along a 25-m-long transect in an irrigation ditch system in Italy. Our objective was to understand the factors inducing this species' intense digging, which can result in bank collapse and consequently in severe damage to both agricultural fields and natural ecosystems. Burrow morphology and position, together with their occupancy by crayfish and digging, were recorded once every 6 h for 10 consecutive days. The majority of burrows were simple, although a few had a chimney and were constructed at a farther distance from the water surface than simple burrows. Burrow occupancy and digging, together with their plugged/unplugged status, were constant throughout a 24-h cycle and were not related to any abiotic parameter of the habitat. Crayfish occupied and dug a burrow for a relatively short time (6-h on average). Once abandoned, old burrows were rarely reoccupied and often collapsed, while crayfish excavated new ones. As a result, the overall number of burrows increased. This massive use of banks by *P. clarkii* seems to be related to soil composition and humidity, which favour crayfish digging but also cause the easy collapse of burrows.

7. Berrill M, Chenoweth B. 1982. The burrowing ability of nonburrowing crayfish. American Midland Naturalist 108(1): 199-201.

   Abstract: Of the 9 spp. of crayfish [*Orconectes rusticus*, *O. propinquus*, *O. obscurus*, *O. virilus*, *O. immunis*, *Cambarus bartoni*, *C. robustus*, *Fallicambarus fodiens* and *Cambarus diogenes*] in southern Ontario, 2 are primary or secondary burrowers, 4 are tertiary burrowers and 3 have been considered nonburrowers. Individuals of all 7 spp. of tertiary burrowers and nonburrowers dug burrows and sealed them when placed in aquaria with mud substrates from which the water was gradually drained. It appears likely that normally nonburrowing species could survive short-term drought by sealing themselves in burrows in the manner more typical of burrowing species.

8. Borsboom A. 1998. Aspects of the biology and ecology of the Australian freshwater crayfish, *Euastacus urospinosus* (Decapoda: Parastacidae). Proceedings of the Linnean Society of New South Wales 119(0): 87-100.

   Abstract: The range of the upland freshwater crayfish, *Euastacus urospinosus*, has been extended to the Conondale Ranges (southeastern Queensland) where it occurs in creeks as well as bank burrows in rainforest at 450-550 m altitude. During sampling and trapping from 1982-1994 a total of 685 individuals were examined and aspects of reproduction, population structure, growth and habitat usage investigated. Breeding females range from 33.8-51.8 mm ocular carapace length (OCL), appear to breed annually, carry a mean of 51 (3-119) eggs and average 31 (3-93) young. Mating apparently commences in April with males moving considerable distances (>20 m) to burrows housing mature females to pair with them. Eggs are laid about May or June, incubated for four to five months, hatch in late October or November and young released in December in the creeks. Adults only live in bank burrows and immature individuals occur predominantly in the creek. The mean OCL for crayfish in the creeks is 11.2 mm (n = 492) and 30.3 mm (n = 162) in bank burrows. The smallest free-living individual had an OCL of 5.5 mm and the largest, a male, measured 54.1 mm OCL and weighed 84.5 grams. It is estimated that females take approximately six years to reach breeding size. A simple trapping method using black plastic tubing inserted at entrances, enabled regular capture of crayfish in burrows. The resulting mark-recapture program has shown that burrows are normally only occupied by one individual, except during mating in April; however, trapping success is correlated with water temperature, with least success in winter. OCL has also been demonstrated to increase with burrow entrance diameter.

9. Bouchard RW, Etnier DA. 1979. *Cambarus d*eweesae new species of primary burrowing crayfish from the Ridge and Valley Province in Tennessee, USA. Proceedings of the Biological Society of Washington 92(3): 589-600.

   Abstract: *C.* (*Depressicambarus*) *deweesae* sp. nov., a primary burrowing crayfish, is described from the Ridge and Valley province in Anderson and Roane counties, Tennessee (Tennessee River basin). The known localities lie near the foot of Walden Ridge, an escarpment that delimits the eastern margin of the Cumberland Mountains and Cumberland Plateau sections of the Appalachian Plateaus province. Color notes describing its reddish color pattern, relationships with its closest ally *C.* (*D.*) *striatus* Hay, distribution, life history notes and ecological data are presented.

10. Bouchard RW, Hobbs HHJ. 1976. A new subgenus and 2 new species of crayfishes of the genus *Cambarus* (Decapoda: Cambaridae) from the Southeastern USA. Smithsonian Contributions to Zoology (224): 1-15.

    Abstract: A new subgenus *Exilicambarus* is proposed to receive a single species, *Cambarus* (*Exilicambarus*) *cracens*, described from SE tributaries of Guntersville Lake (impounded Tennessee River) in DeKalb and Marshall counties, Alabama [USA]. A 2nd previously undescribed species, *C.* (*Jugicambarus*) *nodosus*, is a burrowing crayfish closely allied to *C.* (*J.*) *carolinus* (Erichson), and is reported from the Hiwassee, Savannah, and Chattahoochee drainage systems in Tennessee, North Carolina, and Georgia.

11. Boulton AJ. 1989. Over-summering refuges of aquatic macroinvertebrates in two intermittent streams in Central Victoria Australia. Transactions of the Royal Society of South Australia 113(1-2): 23-34.

    Abstract: Eight potential refuges for macroinvertebrates were sampled in two intermittent streams in central Victoria, Australia, during summer 1982-83 and summer 1983-84. Ninety-one aquatic taxa, mostly insects, were recorded. Receding pools harboured nearly three-quarters of these taxa; comparatively few were collected from the hyporheos or the water in crayfish burrows. Almost half the taxa were from refuges that did not hold free water. Macroinvertebrates persisted as desiccation-tolerant eggs (mayflies), larvae (chironomids and some beetles) or adults (beetles). There was remarkable similarity between the broad taxonomic representation in these refuges and those described for intermittent streams in Ontario, Canada.

12. Brewer JS. 1999. Effects of fire, competition and soil disturbances on regeneration of a carnivorous plant (*Drosera capillaris*). American Midland Naturalist 141(1): 28-42.

    Abstract: Although chronically low soil fertility is widely recognized as an important selection pressure on carnivorous plants, the effects of other potentially important selection pressures, such as natural disturbances, have largely been ignored. In this study, I examined the effects of fire and removal of live plants and litter on seedling establishment of *Drosera capillaris* (pink sundew), a small insectivorous plant common to wet, nutrient-poor pine savannas of the southeastern United States. I also examined the effects of soil disturbances associated with crayfish burrows on mortality. Fires occurring during tire winter of 1996/1997 increased the density, growth and establishment of seedlings during the growing season of 1997. In addition to fires, local removal of established plants and their associated litter greatly increased seedling density and growth within savannas. The proportion of rosettes that flowered at sites not burned recently (>1 year before) was nearly twice that at sites burned more recently (< 1 year before; 0.183 vs. 0.107, respectively). Between May and August of 1997, mortality of sundews at recently-burned sites resulted in nearly equivalent densities at all sites by August 1997. Most of this mortality was caused by burial by shifting sediment associated with erosion of crayfish chimneys, rather than by competition from resprouting vegetation. Smaller rosettes were disproportionately buried by sediment and killed. These results suggest that frequent burial of sundews, with its disproportionate effects on juvenile mortality, selects for rapid growth and establishment. I hypothesize that fire and carnivory permit rapid growth of juveniles and facilitate establishment of sundews in nutrient-poor wet savannas.

13. Carpenter CC. 1953. A Study of Hibernacula and Hibernating Associations of Snakes and Amphibians in Michigan. Ecology 34(1): 74-80.

14. Cashmore J, Soluk DA. 2003. Burrow fidelity and foraging behavior of the Devil crayfish (*Cambarus diogenes*) [Web Page]. Located at: http://www.benthos.org/database/allnabstracts.cfm/db/Athens2003abstracts/id/163.

Abstract: Evolutionary theory suggests that organisms will defend anything in which they have invested large amounts of energy or time. Burrowing crayfish can spend months constructing and maintaining elaborate burrow systems, which may extend for many meters. To test the hypothesis that burrowing crayfish would show fidelity to and defense of their burrow system we studied *Cambarus diogenes* in a seasonally wet meadow in Door County, Wisconsin. Sixty-one crayfish were individually marked and their movements tracked during July and August of 2002. Twenty-three individuals were observed at least twice over a period of at least 5 days. Of these, 19 (82.6%) remained in the same burrow for the duration of the study. In those cases where new crayfish were observed in burrows, they were larger than the previous occupants, suggesting they had possibly forcibly displaced the former occupant. Foraging activities of individuals occurred very close to their own burrow entrances, thus they would appear to have few opportunities to move into new burrows. Because so little is known about the ecology and behavior of burrowing crayfish, it is still unclear how food abundance and predation risk may influence their fidelity to particular burrow systems.

15. Cooper JE, Skelton CE. 2003. A new burrowing crayfish of the genus *Cambarus* Erichson, 1846 (Decapoda: Cambaridae) from the lower Flint River Basin in the Dougherty Plain of Georgia, with notes on *C.* (*D.*) *harti* Hobbs, 1981. Proceedings of the Biological Society of Washington 116(3): 827-838.

Abstract: *Cambarus* (*Depressicambarus*) *doughertyensis* is a new species of obligate burrowing crayfish known from a single locality in the lower Flint River basin in the Dougherty Plain of the East Gulf Coastal Plain, Dougherty County, Georgia. It appears to be most closely related to *Cambarus* (*D.*) *harti* Hobbs, which is known from two localities in the western Piedmont Plateau, Meriwether County. Although the two species are morphologically similar in many respects, *C.* (*D.*) *doughertyensis* differs from *C.* (*D.*) *harti* in having a longer areola; a plethora of tubercles on the carpus and ventral surface of the palm; more tubercles on the opposable surfaces of both fingers of the chela, and differences in the morphology of those surfaces; a lack of spines or tubercles on the proximal podomere of the uropod; a radically different color pattern; and in a number of other characters. Spines on the ventral keel of the rostrum of crayfishes other than certain Mexican crayfishes of the genus *Procambarus* Ortmann are reported for the first time. Inadvertent errors in the description of *C.* (*D.*) *harti* are corrected.

16. Creaser EP. 1931. Some cohabitants of burrowing crayfish. Ecology 12(1): 243-244.

Abstract: During the course of a zoological expedition in the Missouri Ozark Mountains this past summer the writer, in company with Mr. E. B. Williamson, dug some specimens of *Cambarus diogenes* from their burrows. The specimens were obtained in a dried slough adjacent to the Current River about 2 miles south of Van Buren, Carter County, Missouri. During high water the slough is flooded by backwater from the river. The water level on August 27, 1930, was reached after digging through about 3 feet of hard clay. After the infuriated crayfish had been extracted a great many smaller crustaceans were seen in the pocket of the burrow. Examination disclosed the presence of ostracods, copepods, and amphipods in great abundance. A quart of water was taken back to camp, and, after the mud had settled, the animals were collected and preserved. More than 6,000 specimens were obtained as estimated by a count, and many, no doubt, were lost in the collecting due to the crude methods employed. Of the 3 species obtained in the burrow the ostracods were by far the most numerous. Most of the amphipods were immature but no nauplii of the copepod were obtained.

17. Fitzpatrick JFJ. 1978. A new burrowing crayfish of the genus *Cambarus* from Southwest Alabama, USA (Decapoda, Cambaridae). Proceedings of the Biological Society of Washington 91(3): 748-755.

Abstract: *C.* (*Lacunicambarus*) *miltus* sp. nov. from Baldwin County, Alabama [USA], was described and distinguished by its small size and concolorous brick-red color. The presence of additional color patterns in the complex made it difficult to identify the subspecies from the "Delta" region of Mississippi [USA] and extreme western Tennessee [USA].

18. Flotemersch JE, Jackson DC. 1998. Utilization of terrestrially burrowing crayfish by Channel Catfish in a Floodplain-River Ecosystem. Proceedings of the Symposium on Catfish 2000, Davenport, IA, USA: Irwin ER, Hubert WA, Rabeni CF, Schramm HLJ, Coon T. American Fisheries Society Symposium. Catfish 2000: Proceedings of the International Ictalurid Symposium. 5410 Grosvenor Lane, Suite 110, Bethesda, MD, 20814-2199, USA: American Fisheries Society. p. 508 American Fisheries Society Symposium; 24.

19. Flotemersch JE, Jackson DC. 2003. Seasonal foraging by Channel Catfish on terrestrially burrowing crayfish in a Floodplain-River Ecosystem. Ecohydrology and Hydrobiology 3(1): 61-70.

    Abstract: The seasonal use of terrestrially burrowing crayfish as a food item by channel catfish *Ictalurus punctatus* was studied in channelized and non-channelized sections of the Yockanookany River (Mississippi, USA). During seasonal inundation of the floodplains, the crayfish occupied open water on the floodplains. Adult channel catfish aggregated in locations where the river channel and floodplain were coupled and subsequently foraged heavily on the crayfish. Decoupling floodplains from the river by flood control activities such as channelization, dredging and levee construction can modify channel catfish stock interactions with terrestrially burrowing crayfish and reduce potential benefits from this foraging.

20. Gelwick FP. 2000. Grazer identity changes the spatial distribution of cascading trophic effects in stream pools. Oecologia (Berlin) 125(4): 573-583.

    Abstract: Non-lethal effects of predators on prey behavior can mediate trophic cascades, but the extent of effects depends on habitat characteristics and risk sensitivity of prey. Furthermore, predation risk for stream organisms varies along the depth gradient and strongly influences their behavior. Grazing minnows (*Campostoma anomalum*) and crayfish (*Orconectes virilis*) are both prey for largemouth bass (*Micropterus salmoides*) in streams, but differ in their predator-avoidance behavior. This study contrasts the effects and mechanisms of non-lethal trophic cascades on the spatial distribution of filamentous green algae among stream pools and along a depth gradient within pools. Presence/absence of a largemouth bass was crossed with four combinations of the two grazer species (0 grazers, 30 minnows, 30 crayfish, and 15 each) in outdoor, experimental streams. Grazer densities were maintained by restocking. I used geostatistics to quantify spatial patterns of predator and grazer habitat use, height of filamentous algae in the water column, and spatial covariation of water depth with algal height, and depth with grazer habitat use. In streams with only minnows, bass were sedentary, and hid within tall algae in a single "bass pool". In pools with grazed algae, bass actively pursued prey within and among pools and used deeper water. This set up a hierarchy of risk to grazers along the depth gradient from bass in deep water to potential risk from terrestrial predators in shallow water. Thus, minnows were more sensitive than crayfish to predation risk from bass, but less sensitive than crayfish to risk from terrestrial predators. Minnows mediated cascades at the scale of whole pools by avoiding "bass pools", but only if crayfish were absent. Crayfish avoided potential interactions both with terrestrial predators and bass by grazing and burrowing in deeper water at night (when bass were inactive), and by hiding in burrows during daytime. Crayfish without burrows avoided bass and crayfish defending burrows by using shallow edges of pools as corridors, but did not graze there. Thus, crayfish-mediated cascades were limited to pool edges. Effects of grazer identity may extend to other consumers via modification of risk for biota that use filamentous algae as either foraging or refuge habitat.

21. Gherardi F, Tricarico E, Ilheu M. 2002. Movement patterns of an invasive crayfish, *Procambarus clarkii*, in a temporary stream of southern Portugal. Ethology Ecology & Evolution 14(3): 183-197.

    Abstract: Radio-telemetry was used to determine the spatial behavior of the invasive crayfish, *Procambarus clarkii* (Girard), in a temporary stream in southern Portugal during the dry period. One aim was to understand the behavioral mechanisms that allows crayfish to withstand extreme environmental conditions. This study can also provide data relevant to developing programs for the prevention of this species' expansion. During a drought, the red swamp crayfish does not aestivate. Except for one female, radio-tagged specimens dispersed within the habitat with a speed ranging 1-11 m times d super(-1). A wide inter-individual variation was shown in the extent of locomotion. Locomotory speed was significantly correlated with crayfish size. Movement was not related to sex, the hour of the day, or several abiotic parameters of the habitat, with the exception of the water depth. Movement patterns appeared complex: one or more short peaks of intense locomotion often alternated with periods of slow speed or no movement. *Procambarus clarkii* maintained its temperature below environmental extremes, largely by occupying burrows or refuges. Although shelters were limiting in the habitat under study, following a move, radio-tracked individuals did not re-occupy the same burrow, but rather entered the first one found vacant. Refined orienting capabilities have been described in decapods including crayfish, but in this context homing behavior seems not to occur.

22. Gherardi F, Barbaresi S. 2000. Invasive crayfish: Activity patterns of *Procambarus clarkii* in the rice fields of the Lower Guadalquivir (Spain). Archiv Fuer Hydrobiologie 150(1): 153-168.

    Abstract: The activity of a naturalized population of the invasive Nearctic crayfish, *Procambarus clarkii*, in the Lower Guadalquivir rice fields (Andalucia, Spain), has been studied using both traditional and radio-telemetry techniques. Our results lead us to propose that *P. clarkii* shows two opposed patterns of activity, featuring (1) a wandering phase, without any daily periodicity, characterized by short peaks of high speed of locomotion, and (2) a longer stationary phase, during which crayfish hide in the burrows by day, emerging only at dusk to forage. Other behaviors (such as fighting or mating) also take place at night-time. During the wandering phase, breeding males move up to 17km in 4 days and cover a wide area (up to 20 km^2 in 4 days). Breeding males fitted with radio-transmitters were tracked back to the point of release within four days. This intensive activity helps dispersion in this species. Further studies are required to understand the adaptive significance of this locomotory behavior, which appears expensive and dangerous, and the mechanisms of home-range recognition and orientation.

23. Gibling MR, Nanson GC, Maroulis JC. 1998. Anastomosing river sedimentation in the Channel Country of central Australia. Sedimentology 45(3): 595-619.

    Abstract: Anastomosing river plains of the Channel Country, central Australia, have aggraded slowly over the past 100 ka. Channel sediments accumulate mainly as accretionary benches of mud and sand, sandy channel-base sheets and vegetation-shadow deposits. The channels are laterally stable and the sediments have aggraded locally against erosional banks of tough floodplain muds. Channel sediments are profoundly affected by desiccation during dry periods and by bioturbation caused by within-channel trees and burrowing invertebrates, especially crayfish. Excavations show that mud-dominated channel bodies of low width:thickness ratio are generated by a combination of vertical and lateral accretion. Levees and braided surfaces, composed mainly of mud aggregates, border the channels and are activated during valley-wide floods, which lay down distal mud sheets. Floodplain muds are converted to vertisols with gilgai, deep desiccation cracks, and impregnations of carbonate and gypsum. A fixed-channel facies model is applicable to the Channel Country river deposits. Anastomosis apparently results from the need for the system to move large volumes of water and moderate sediment loads across low-gradient interior basins. Channels distant from upland source areas receive an abundant supply of pedogenic, sand-sized mud aggregates generated on adjacent floodplains and reworked into braid bars during valley-wide floods. Some quartz sand is provided from excavation of subsurface Pleistocene sands in deep channels and waterholes and from aeolian dunes on the floodplains. Adjacent gibber plains supply some gravel to the system.

24. Grow L. 1981. Burrowing behavior in the crayfish *Cambarus diogenes diogenes*. Anim Behav 29(2): 351-356.

    Abstract: The crayfish, *C. d. diogenes* Girard (1852), spends most of its life cycle in individually constructed undergrown burrows. The architectural behavioral patterns and sequences with which adult *C. d. diogenes* excavate an underground chamber were evaluated. Two motor patterns (pushing and carrying) and 3 burrow stages (shallow depression, angular pit and burrow with 2 openings) were identified. During the development of burrowing behavior in juveniles, a 3rd motor pattern (fanning) occurred. While the 3 motor patterns are functional soon after hatching, crayfish may learn to orient the carrying motor pattern for the most efficient excavation of a stage-3 burrow with 2 openings. The ground-water level determined the final structure of a burrow.

25. Grow L. 1982. Burrowing/soil-texture relationships in the crayfish *Cambarus diogenes diogenes* Girard (Decapoda, Astacidae). Crustaceana 42: 150-159.

26. Grow L, Merchant H. 1980. The burrow habitat of the crayfish *Cambarus* diogenes diogenes. American Midland Naturalist 103(2): 231-237.

Abstract: Data were collected on various physical and chemical parameters of the burrow microenvironment of the crayfish, *C. d. diogenes*. While the pH levels of the burrow water were well within the range tolerated by most crayfish, the dissolved O2 content of the burrow water appeared to be below that necessary to support crayfish respiration. Burrow-depth measurements showed little seasonal variation. Soil-texture analyses revealed that the crayfish were burrowing in soils classified as clay and silty clay. These results are discussed in terms of the fossorial life-style adopted by *C. d. diogenes*.

27. Growns IO, Richardson AMM. 1988. Diet and burrowing habits of the freshwater crayfish *Parastacoides tasmanicus tasmanicus* Clark (Decapoda, Parastacidae). Australian Journal of Marine and Freshwater Research 39(4): 535-534.

Abstract: *Parastacoides tasmanicus tasmanicus*, which burrows extensively into the peat soils of south-western Tasmania [Australia] is, like most freshwater crayfish, an omnivore. All food categories in the diet vary seasonally. Detritus, including unidentifiable material, is the major food type present in the gut contents, although root and algal material are also important. Less animal material is present in the diet than in the diet of open-water species, and the taxa consumed and size of prey differ between the adults and juveniles. Cannibalism occurred in less than 1% of the crayfish examined, an incidence considerably lower than that reported for any other crayfish species. Animal material was of comparatively little importance, but the low levels of mineral nutrients, bacteria and fungi in peat soils probably increase its importance as a protein source. The burrows of *P. t. tasmanicus* include blind, root-lined chambers beneath clumps of sedgeland plants. Larger animals occupy larger burrows and these have a higher proportion of their volume in the form of blind chambers. The animal appears to spend the majority of its time foraging within its burrow system, a behavior that contrasts with most other crayfish.

28. Guiasu RC, Dunham DW. 2003. The ecology, behaviour, and conservation of the vulnerable burrowing crayfish *Fallicambarus fodiens* (Decapoda, Cambaridae). Sicb Annual Meeting & Exhibition Final Program and Abstracts 2003: 184.

29. Hamr P, Sinclair L. 1985. Burrowing activity of the crayfish *Orconectes propinquus* in Southern Ontario, Canada. American Midland Naturalist 113(2): 390-391.

Abstract: The crayfish *Orconectes propinquus*, previously described as a fast-water, nonburrowing species, constructed extensive burrow networks in soft-bottomed streams in southern Ontario. The habitat, burrows and burrowing behavior of this crayfish are described, and its burrowing is discussed.

30. Hamr P, Richardson A. 1994. Life history of *Parastacoides tasmanicus tasmanicus* Clark, a burrowing freshwater crayfish from South-Western Tasmania. Australian Journal of Marine and Freshwater Research 45(4): 455-470.

Abstract: The life history of the semi-terrestrial burrowing freshwater crayfish *Parastacoides tasmanicus tasmanicus* was studied in the wet heathlands of southwestern Tasmania. Data on seasonal reproduction, fecundity and growth were obtained from regular monthly sampling over a period of two years. The development of gonads, size at maturity, sexual dimorphism and reproductive condition were determined by detailed examination of changes in reproductive morphology and gonad condition. *P. t. tasmanicus* attains maturity at a relatively late age (3-5 years) and large size (25-30 mm carapace length) and has a long life span (< 10 years) and a slow and variable growth rate. The growth rate appears to be a function of cold water temperature and low-nutrient diets. Miles reach sexual maturity at a smaller size than do females. Mating and spawning, which closely follow the female moult, occur in early autumn when males and reproductive females pair within their burrow systems; eggs are carried over winter and hatch early the following summer, and young remain attached to their mothers until mid summer. Mature females appear to exhibit a biennial moulting and breeding cycle, an apparently unique strategy among parastacid crayfish, which is probably a result of the cooler climate conditions in Tasmania.

31. Harris JA. 1903. The habits of *Cambarus*. American Naturalist 37(441): 601-608.

32. Harvey MS. 1990. Pezidae a new freshwater mite family from Australia (Acarina, Halacaroidea). Invertebrate Taxonomy 3(6): 771-782.

Abstract: A new halacaroid family, Pezidae, is erected for the new genus *Peza*, with two new species *Peza ops* (type species) and *Peza daps*. *P. ops* has been widely collected in south-eastern Australia, while *P. daps* is known only from a single female taken from the gill chamber of a burrowing crayfish, *Engaeus fultoni* Smith and Schuster (Crustacea: Decapoda: Parastacidae), in the Otway Anges, Victoria. During winter and spring, females to both species apparently attach their eggs to their hind legs. The Pezidae is regarded as the sister-group of the remaining Halacaroidea.

33. Herberholz J, Sen MM, Edwards DH. 2003. Parallel changes in agonistic and non-agonistic behaviors during dominance hierarchy formation in crayfish. Journal of Comparative Physiology A-Neuroethology Sensory Neural and Behavioral Physiology 189(4): 321-325.

Abstract: Agonistic and non-agonistic behaviors were studied before, during, and after the formation of social status in crayfish. Differences in the expression of a non-agonistic behavior by dominant and subordinate crayfish developed in parallel with the differences in agonistic behaviors that indicate the animals' social status. An increase in burrowing behavior marked the ascendancy of the dominant animal, while an immediate suppression of burrowing paralleled the inhibition of aggressive behavior in the new subordinate. The strikingly similar changes in both agonistic and non-agonistic behaviors following the decision on status suggest related underlying neural mechanisms.

34. Hobbs HHI. 1978. New species of ostracods from the Gulf Coastal Plain (Ostracoda, Entocytheridae). Trans Am Microsc Soc 97(4): 502-511.

Abstract: Three new species of the genus *Ankylocythere* Hart are described from crayfishes (Cambaridae) collected in Alabama, Florida and Mississippi [USA] making a total of 23 species of the genus. *A. freyi* sp. nov. and *A. krantzi* sp. nov. were in association with crayfishes of varying habits (streams, roadside ditches, burrows) and thus do not demonstrate any type of specificity for host or environment. *A. chipola* sp. nov. demonstrates ecological specificity for the burrow environment, as it is confined to species of crayfishes that spend all or most of their lives in constructed burrows.

35. Hobbs HHI, Rewolinski SA. 1985. Notes on the burrowing crayfish *Procambarus gracilis* (Decapoda, Cambaridae) from Southeastern Wisconsin, USA. Crustaceana (Leiden) 48(1): 26-33.

36. Hobbs HHJ, Carlson PH. 1985. A new member of the genus *Distocambarus* (Decapoda, Cambaridae) from the Saluda Basin South Carolina, USA. Proceedings of the Biological Society of Washington 98(1): 81-89.

Abstract: The burrowing crayfish *Distocambarus* (*Fitzcambarus*) *youngineri* sp. nov is described from 2 localities in the southwestern part of Newberry County, South Carolina, USA. In most reports it resembles the sympatric *D.* (*F.*) *carolsoni*, but the 1st pleopod of the male differs little from that of its more primitive congeners assigned to the nominate subgenus.

37. Hobbs HHJ, Mcclure AC. 1983. On a small collection of entocytherid ostracods, with the descriptions of 3 new species. Proceedings of the Biological Society of Washington 96(4): 770-779.

Abstract: Three new entocytherid ostracods, *Ascetocythere jezerinaci*, *Ankylocythere carpenteri* and *Ornithocythere thomai*, infesting burrowing crayfishes, are described from Lee County, Virginia [USA], Elmore County, Alabama and Washington County, Alabama, [USA] respectively. Reports of the ostracods infesting crayfishes from 9 additional collections containing burrowing crayfishes from Kentucky, Indiana, Ohio, Virginia and West Virginia [USA] are presented.

38. Hobbs HHJ, Peters DJ. 1977. The entocytherid ostracods of North Carolina, USA. Smithsonian Contributions to Zoology (247): 1-73.

Abstract: The entocytherid ostracods are obligate external symbionts of crayfishes, and in North Carolina [USA] comprise 31 spp. distributed among 13 genera [*Ankylocythere, Ascetocythere, Cymocythere, Dactylocythere, Donnaldsoncythere, Entocythere, Harpagocythere, Litocythere, Lordocythere, Okriocythere, Ornithocythere, Uncinocythere*]. Except for 5 spp. that seem to be restricted to burrowing crayfishes, all infest more than 1 host species. Following a brief historical account of the studies of the species reported to occur in

North Carolina are discussions of the topography and drainage systems of the state, entocytherid infestations and associates, hosts and the ostracods infesting them, zoogeographic and ecological distributions, life history and taxonomic characteristics employed in recognizing the North Carolina entocytherid fauna. Keys to the genera and species introduce the annotated list containing synonymies, diagnoses of the genera and species, type-localities, ranges, hosts and entocytherid associates. Illustrations and distribution maps are also provided for each species. A new genus, *Aphelocythere*, is proposed to receive a previously undescribed species, *A. acuta*. Five additional new species are included from the State: *Dactylocythere isabelae*, *D. peedeensis*, *Donnaldsoncythere leptodrilus*, *Entocythere costata*, *Harpagocythere baileyi*. Nine of the 31 spp. occur in the Coastal Plain Province of the State, 19 in the Piedmont and 17 in the Mountain Province. Fourteen species are restricted to the Atlantic slope, 4 to streams draining into the Gulf of Mexico, and 13 occur on both sides of the Appalachian Divide.

39. Hobbs HHJ, Peters DJ. 1989. New records of entocytherid ostracods infesting burrowing crayfishes, with the description of *Ascetocythere stockeri*, new species. Proceedings of the Biological Society of Washington 102(2): 324-330.

Abstract: New records of the occurrence of entocytherids on burrowing crayfishes are reported from Kentucky, North Carolina, Virginia, and West Virginia (USA). These include members of the genera *Ascetocythere* (3), *Dactylocythere* (3), *Donnaldsoncythere* (1), *Entocythere* (2), and *Uncinocythere* (2). *Ascetocythere stockeri*, a close relative of *A. cosmeta*, is described from four localities in the Ohio Basin in Mason and Cabell counties, West Virginia, and a single locality in carter county, Kentucky. [The following new records are discussed: *Ascetocythere cosmeta*, *A. hyperoche*, *Dactylocythere crawfordi*, *D. daphnioides*, *D. macroholca*, *Donnaldsoncythere donnaldsonensis*, *Entocythere elliptica*, *E. harrisi*, *Uncinocythere simondsi*, and *U. zancla*].

40. Hobbs HHJ, Peters DJ. 1991. Additional records of entocytherid ostracods infesting burrowing crayfishes, with descriptions of five new species. Proceedings of the Biological Society of Washington 104(1): 64-75.

Abstract: New records of entocytherids on burrowing crayfishes are recorded from Alabama [USA], Kentucky, Mississippi, Ohio, Tennessee, Virginia, and West Virginia. Represented are species of the genera *Ankylocythere* (5 species), *Ascetocythere* (3), *Dactylocythere* (9), *Donnaldsoncythere* (1), *Lordocythere* (1), *Plectocythere* (1), and *Uncinocythere* (1). New species include *Ankylocythere prolata* from Baldwin County, Alabama, *Dactylocytere guyandottae* from Wyoming County, West Virginia, *Dactylocythere lepta* from Powell County, Kentucky, *Dactylocythere pygidion* from Claiborne County, Tennessee, and *Plectocythere kentuckiensis* from Powell County, Kentucky.

41. Hobbs HHJ, Peters DJ. 1993. New records of entocytherid ostracods infesting burrowing and cave-dwelling crayfishes, with descriptions of two new species. Proceedings of the Biological Society of Washington 106(3): 455-466.

Abstract: The ranges, including several records of new localities, of 15 entocytherid ostracods infesting burrowing and cave-dwelling crayfishes collected in the southeastern USA (most from Kentucky, Tennessee, and West Virginia) are summarized. The genera represented are *Ascetocythere*, *Cymocythere*, *Dactylocythere*, *Donnaldsoncythere*, *Lordocythere*, *Phymocythere* and *Uncinocythere*. *Dactylocythere cryptoteresis* sp. nov. on *Cambarus diogenes* and *Phymocythere lophota* sp. nov. on *C. monongalensis* are described from West Virginia.; 26 ref.

42. Hobbs HHJ, Robison HW. 1985. A new burrowing crayfish *Fallicambarus harpi*, new species (Decapoda, Cambaridae) from Southwestern Arkansas, USA. Proceedings of the Biological Society of Washington 98(4): 1035-1041.

Abstract: *Fallicambarus* (*F.*) *harpi*, a burrowing crayfish, is described from two localities in the Caddo River (a tributary of the Ouachita River) basin of Pike County, Arkansas. It differs conspicuously from its closest relatives, *F.* (*F.*) *strawni* (Reimer, 1966) and *F.* (*F*). *jeanae* Hobbs (1973), in possessing a free (never adnate) cephalic process on the first pleopod of the first form male.

43. Hobbs HHJ, Robison HW. 1988. The crayfish subgenus *Girardiella* (Decapoda, Cambaridae) in Arkansas, USA, with the descriptions of two new species and a key to the members of the *gracilis*

Group in the genus *Procambarus*. Proceedings of the Biological Society of Washington 101(2): 391-413.

Abstract: The burrowing crayfish *Procambarus* (*Girardiella*) *ferrugineus* is described from two localities in the lower Arkansas River system, and *P.* (*G.*) *regalis*, from eight localities in the Ouachita and Red River basins of southwestern Arkansas. Their closest allies are *P.* (*G.*) *gracilis*, *P.* (*G.*) *liberorum*, and *P.* (*G.*) *reimeri*. *Procambarus* (*G.*) *regalis* may be distinguished from the others by possessing a rostrum with tapering, thickened lateral carinae and conspicuously thickened postorbital ridges; *P.* (*G.*) *ferrugineus* differs from all except *P.* (*G.*) *regalis* and *P.* (*G.*) *reimeri* in exhibiting chelae with tuberculate palms, and from the last named species in having a very narrow or obliterated areola. Notes on, and spot maps depicting, the distribution of the eight members of *Girardiella* occurring in Arkansas follow a key to all of the members of the *gracilis* Group of the subgenus.

44. Hobbs HHJ, Robison HW. 1989. On the Crayfish Genus *Fallicambarus* (Decapoda, Cambaridae) in Arkansas, USA, with Notes on the *fodiens* Complex and Descriptions of Two New Species. Proceedings of the Biological Society of Washington 102(3): 651-697.

Abstract: The genus *Fallicambarus*, embracing 16 species [including *F. macneesei*, *F. jeanae*, *F. devastator*, *F. harpi*, *F. strawni*, *F. bygersi*, *F. gorcloni*, *F. burrisi*, *F. danielae*, *F. hortoni*, and *F. oryktes*] of burrowing crayfishes, is represented in Arkansas by eight of them, five of which are members of the nominate subgenus and three assigned to the subgenus *Creaserinus*. A key is provided for the identification of the 16, the combined ranges of which extend from Ontario to southwestern Texas and southwestern Georgia, and from South Carolina to Maryland. *Fallicambarus* (*F.*) *petilicarpus*, a close relative of *F.* (*F.*) *dissitus*, is described from Union County, Arkansas, and *F.* (*C.*) *gilpini*, related to *F.* (*C.*) *caesius*, from Jefferson County, Arkansas. Data are presented for placing *Fallicambarus* (*C.*) *uhleri* (Faxon) and *F.* (*C.*) *hedgpethi* (Hobbs) in the synonymy of *F.* (*C.*) *fodiens* (Cottle). For each of the species occurring in Arkansas, as a complete a synonymy as possible is offered along with a diagnosis of the species; also included are a statement of the range, a list of localities (also noted on spot maps) and specimens examined, color notes, size ranges of adults, and life history and ecological notes.

45. Hobbs HHJ, Whiteman M. 1991. Notes on the Burrows Behavior and Color of the Crayfish *Fallicambarus devastator* (Decapoda, Cambaridae). Southwestern Naturalist 36(1): 127-135.

46. Hobbs HHJ, Peters DJ. 1993. New Records of Entocytherid Ostracods Infesting Burrowing and Cave-Dwelling Crayfishes, with Descriptions of Two New Species. Proceedings of the Biological Society of Washington 106(3): 455-66.

Abstract: The ranges, including several scores of new localities, of 15 entocytherid ostracods infesting burrowing and cave-dwelling crayfishes collected in the southeastern United States (most from Kentucky, Tennessee, and West Virginia) are summarized. The genera represented are *Ascetocythere*, *Cymocythere*, *Dactylocythere*, *Donnaldsoncythere*, *Lordocythere*, *Phymocythere*, and *Uncinocythere*. The new *Dactylocythere cryptoteresis* and *Phymocythere lophota* are described from Upshur and Wirt counties, West Virginia, respectively.

47. Horwitz P, Knott B. 1991. The Faunal Assemblage in Freshwater Crayfish Burrows in Sedgeland and Forest at Lightning Plains Western Tasmania. Papers and Proceedings of the Royal Society of Tasmania 125: 29-32.

Abstract: The faunal assemblage of crayfish burrow was examined intensively at Lightning Plains in western Tasmania, [Australia] in sedgeland and adjacent forest, to determine variations in species occurrences and abundances both within one habitat type and between two habitats. Species-sample curves showed that over 90% of the species found in ten samples could be collected by taking only five. Despite the fact that the host crayfish species was the same, each habitat was found to display a characteristic assemblage. Variations between the assemblages are attributed to differences in soil conditions, vegetation structure and watertable behaviour.

48. Horwitz PHJ, Richardson AMM. 1986. An Ecological Classification of the Burrows of Australian Freshwater Crayfish. Australian Journal of Marine and Freshwater Research 37(2): 237-242.

Abstract: A classification of freshwater crayfish burrows, based on their relationship to the water-table, is presented. Burrows are divided into three classes, the third of which is apparently not found outside Australia and contains burrows which are independent of the water-table, receiving their water from surface run-off. The classification is compared with Hobbs classification of North American crayfish, which is based on their burrowing behavior.

49. Horwitz P. 1997. Comparative Endemism and Richness of the Aquatic Invertebrate Fauna in Peatlands and Shrublands of Far South-Western Australia. Memoirs of the Museum of Victoria 56(2): 313-321.

Abstract: A study of the peatlands and shrublands in far south-western Australia was undertaken to examine patterns of endemism and richness in aquatic invertebrate faunas. Samples of surface water, interstitial water and crayfish burrow water were analyzed from about 45 sites and in each season over a twelve-month period in 1993. Six groups of aquatic invertebrates were chosen for more detailed analyses (mites, oligochaetes, isopods, decapods, dipterans, and odonatans) and resolved to species level. For each species an assessment was made of its distributional status as either widespread and common, regionally endemic (to the southwest), or locally restricted to within the study region. Sites with high levels of local endemism were plotted geographically and their characteristics compared to other sites. The data are related to existing hypotheses concerning the depauperate nature of the freshwater fauna of the south-western part of the continent. It was found that such hypotheses need to be tempered by the role of salt in flowing systems, and the occurrence of hot spots of local endemism for freshwater fauna in the extreme south-west in non-flowing waters (and often subterranean habitats) where groups of non-insect invertebrate fauna show apparently elevated species richness.

50. Ilheu M, Acquistapace P, Benvenuto C, Gherardi F. 2003. Shelter Use of the Red-Swamp Crayfish (*Procambarus clarkii*) in Dry-Season Stream Pools. Archiv Fuer Hydrobiologie 157(4): 535-546.

Abstract: Patterns of shelter use of the red-swamp crayfish, *Procambarus clarkii*, were studied in a temporary stream of the south of the Iberian Peninsula during the summer of 1999. By shelters, we mean both excavated burrows and natural refuges, such as crevices under rocks, boulders, and stones. Both crayfish shelter use and faithfulness, and the relationship between the use of shelters and some abiotic parameters of the habitat were analyzed. Five main issues were raised. (1) Crayfish did not hide exclusively inside excavated burrows, but regularly used natural refuges. The low burrowing activity recorded might be related to the large particles of the sediment and to the scarce presence of free water. (2) Burrows were mostly found either empty or occupied by a single individual, while refuges had a higher rate of occupancy. Shelters were often used by both females and smaller individuals. (3) A role played by burrows and refuges was to help crayfish to withstand high environmental temperatures; in fact, the number of specimens inhabiting the same shelter increased with the air temperature. Shelters also provided protection against predation and cannibalism. Burrows seemed more efficient shelters, since crayfish more often moved from a refuge to a burrow than vice versa. (4) Crayfish were found outside the shelters mainly at night and dawn, while they were mostly hidden in burrows during the day. (5) *Procambarus clarkii* seemed not to be faithful to a unique shelter; thus this species seems to have "ephemeral home ranges" with a shelter as the core. Although refined orienting capabilities have been reported in several decapods, in this case, crayfish did not exhibit a "homing behavior", which may be related to the fact that burrows were used mostly for protection purposes.

51. Irwin JT, Costanzo JP, Lee REJ. 1999. Terrestrial Hibernation in the Northern Cricket Frog, *Acris crepitans*. Can J Zool 77(8): 1240-1246.

Abstract: We used laboratory experiments and field observations to explore overwintering in the northern cricket frog, *Acris crepitans*, in southern Ohio and Indiana. Cricket frogs died within 24 h when submerged in simulated pond water that was anoxic or hypoxic, but lived 8-10 days when the water was oxygenated initially. Habitat selection experiments indicated that cricket frogs prefer a soil substrate to water as temperature decreases from 8 to 2°C. These data suggested that cricket frogs hibernate terrestrially. However, unlike sympatric hylids, this species does not tolerate extensive freezing: only 2 of 15 individuals survived freezing in the -0.8 to -2.6°C range (duration 24-96 h). Cricket frogs supercooled when dry (mean supercooling point -5.5°C; range from -4.3 to -6.8°C), but were easily inoculated by external ice at temperatures between -0.5 and -0.8°C. Our data suggested that cricket frogs hibernate terrestrially but are not freeze tolerant, are not fossorial, and are incapable of supercooling in the presence of external ice. Thus we hypothesized that cricket frogs must hibernate in terrestrial sites that adequately protect against freezing. Indeed, midwinter surveys revealed cricket

frogs hibernating in crayfish burrows and cracks of the pond bank, where wet soils buffered against extensive freezing of the soil.

52. Jezerinac RF, Thoma RF. 1984. An Illustrated Key to the Ohio *Cambarus* and *Fallicambarus* (Decapoda, Cambaridae), with Comments and a New Subspecies Record. Ohio Journal of Science 84(3): 120-125.

Abstract: An illustrated taxonomic key is presented using structures of the chela and carapace to identify the 4 spp. and 2 spp. of *Cambarus* and 1 sp. of *Fallicambarus* known to occur in Ohio. Those forms broadly distributed throughout the state are *C.* (*Lacunicambarus*) *diogenes diogenes* Girard a primary or secondary burrower and *C.* (*Cambarus*) *bartonii cavatus* Hay, a secondary or tertiary burrower; the latter crayfish has not been previously recorded from the state. Species with restricted distributions are *C.* (*C.*) *ortmanni* Williamson, a primary or secondary burrower confined to the Ordovician region of southwestern Ohio *C.* (*C.*) *sciotensis* Rhoades, a stream dweller occurring in the Scioto River, Little Scioto River and tributaries of the Ohio River in Scioto and Lawrence counties, *C.* (*C.*) *b. carinirostris* Hay, a secondary or tertiary burrower frequenting streams of the Flushing Escarpment, Mahoning River and Grand River drainages in eastern and northeastern Ohio, *C.* (*Puncticambarus*) *robustus* Girard, a stream inhabitant occupying primarily tributaries to Lake Erie and central and northern tributaries to the Ohio River and *F.* (*Creaserinus*) *fodiens* (Cottle), a primary burrower occurring chiefly in the glaciated regions of northern Ohio. Species with broad distributions generally have a larger number of species as associates than those with restricted distributions.

53. Johnston CE, Figiel C. 1997. Microhabitat Parameters and Life-History Characteristics of *Fallicambarus gordoni* Fitzpatrick, a Crayfish Associated With Pitcher-Plant Bogs in Southern Mississippi. Journal of Crustacean Biology 17(4): 687-691.

Abstract: *Fallicambarus gordoni*, a crayfish found only in pitcher-plant bogs, is restricted to the DeSoto National Forest, Perry County, Mississippi, U.S.A. The species is active from late fall through late spring, and apparently estivates during the summer when bogs are dry. Ovigerous females were found in late fall and winter, and small juveniles were collected in February. Form I males were found throughout much of the year, except during summer months when no crayfish were collected. Burrows of *F. gordoni* are complex and similar in structure to those of *Fallicambarus fodiens*. Catch per unit effort ranged from 0.02-0.17, suggesting that counting burrow structures will not give an accurate population estimate of this imperiled animal.

54. Kofron CP. 1978. Foods and Habitats of Aquatic Snakes (Reptilia, Serpentes) in a Louisiana USA Swamp. Journal of Herpetology 12(4): 543-54.

Abstract: The foods and habitats of 7 species of aquatic snakes were investigated in a Louisiana swamp, the Atchafalaya River Basin [USA]. *Nerodia rhombifera* was the most abundant species, and *N. cyclopion*, the 2nd most common species, was an ecological associate. Stomachs of 796 aquatic snakes were examined. *N. rhombifera* and *N. cyclopion* fed mainly upon fish, and *Agkistrodon piscivorus* fed upon fish and other vertebrates. Catfish were frequently ingested by *N. rhombifera* and *A. piscivorus*, but rarely by *N. cyclopion*. *N. fasciata* showed preferences for anurans and fish, and *N. erythrogaster* for anurans. *Regina grahami* and *R. rigida* fed upon crayfish. *N. rhombifera* and *N. fasciata* were observed utilizing crayfish burrows, and individuals of all 7 aquatic species occasionally moved considerable distances overland. In the ecosystem under consideration, *N. rhombifera* and *N. cyclopion* are habitat generalists and food specialists; *A. piscivorus* is a habitat specialist and probably a food generalist.

55. Lawrence CS. 2001. Morphology and incidence of Yabby (*Cherax albidus*) burrows in Western Australia. Fisheries Research Report of Western Australia 129(0): 1-29.

Abstract: Yabby (*Cherax albidus*) burrows were recorded from dams, channels and ponds in Western Australia. Twenty five sites were sampled during Spring, 1998 and the burrow morphology and density was described from six of these locations where burrows were present. To improve the sample size and address seasonal trends 49 commercially harvested yabby dams were sampled over the summer of 1999/2000 and the number and density of yabby burrows were recorded. Burrow incidence and morphology was also recorded from 25 research ponds at the Avondale Research Station between 1995-1997. Soil and water chemistry values are presented and their relationships with burrow morphology are discussed. Burrow density (number of burrows/ m^2) was also recorded. Burrowing activity was investigated against the density, sex, and feeding regime of yabbies. Different techniques for casting and excavating the casts of burrows were evaluated. Expanding polyurethane foam was better than concrete, plaster or resin as itwas lighter, less brittle and gave a three dimensional representation of the burrow.

Excavating the casts of burrows using high pressure water was better than digging as it was more efficient and preserved the shape of the casts. The morphology of burrows was characterized by burrow length, depth into dam wall, width, number of entrances and cavern width in the Spring 1998 survey. The average burrow length was 25.8 cm. The maximum distance a burrow penetrated directly into a dam was 64.5 cm, while the longest burrow was 148 cm. Based morphological features burrows were classified as either depressions, angular pits, U-shaped tunnels or networks. The incidence of yabby burrows increased from 25% of dams in Spring 1999 to 70% in Autumn 2000. Burrow density increased significantly from 0.02 burrows/m^2 of bank 0.5m above and below water level in Spring to 0.11 burrows/m^2 in Autumn, but did not increase significantly between Summer and Autumn. The majority of burrows (64%) had only 1 entrance to a simple tunnel (mean width 6.4 cm) leading to a terminal cavern (mean width 12.5 cm). Channels and large dams tended to have longer (22 - 40 cm) and more complex burrows than small dams or ponds (8 - 21 cm). Burrows were more complex where there was a greater variation in water table height. Consequently, burrows in levee banks of channels and dams tended to be more complex than those in the bottom of ponds. In the research ponds, burrowing activity was less in ponds containing only males or unfed yabbies. Similarly the density of burrows during the spring 1998 survey was generally higher where there were more females than male yabbies. Fed yabbies are larger and fitter (physically and reproductively) possibly resulting in increased burrowing activity. There was no relationship between the density of yabbies and the number of burrows in the research ponds. There was a strong relationship between soil type and burrowing in survey 1, with yabbies burrowing more in soil containing high levels of silt. This finding was not supported by the data from survey 2, which involved more dams. Similarly, there was also a strong relationship between water chemistry and burrowing in survey 1. Yabbies burrowed more where calcium, potassium, sodium, chloride and conductivity levels were high, while there was a negative relationship between yabby burrowing and hardness. However, in survey 2 there was no significant relationship between water chemistry and burrowing. When *C. albidus* burrows were present in a dam, pond or channel they were relatively abundant. However, the burrows were generally much shorter than those described in published reports for crawfish (*Procambarus clarkii*) and in anecdotal reports for C. destructor, the commonly farmed yabby from South-eastern and Central Australia.

56. Marlow G. 1960. The Subspecies of *Cambarus diogenes*. American Midland Naturalist 64(1): 229-250.

Abstract: Color patterns for *Cambarus diogenes diogenes* are twofold: (1) a general dark colored crawfish or olive-green on the dorsal surface, a cream colored ventral surface, red-tipped chelae, and (2) a striped phase with three longitudinal light red abdominal stripes, and essentially the same color pattern as (1) above. Wide variation occurs. The color pattern for *C. d. ludovicianus* is diagnostic for the subspecies, being brilliant blue with three red longitudinal abdominal stripes, best seen in the juveniles. Adult color is somewhat less brilliant. Subspecies differentiation between *C. d. diogenes* and *C. d. ludovicianus* is made on the following bases: (1) color patterns; (2) range; (3) cephalic portion of cephalothorax length/areola length ratio of *C. d. diogenes* being 1.44, never ranging below 1.40 and that of *C. d. ludovicianus*, 1.24, never ranging above 1.30; (4) the annulus ventralis of the female *C. d. diogenes* is 1.4 times as wide as long while that of *C. d. ludovicianus* is 1:1; (5) antennal scale length/width of *C. d. diogenes* is less than 1.45, while that of *C. d. ludovicianus* is more than 1.45. All *C. d. diogenes* in the United States show essentially the same ratios as given above. This is borne out statistically, except for a small number in Wells Co., Indiana, where the ratio approaches that of *C. d. ludovicianus* but is higher. No explanation is given for this situation. Ontogenetic variation has been shown to occur for both subspecies, with the cephalic portion of the cephalothorax length/areola length ratio gradually decreasing from juveniles to adults. Intra-sample specimens, although in large series, have little statistical value in the investigation of subspeciation of *C. d. diogenes*, as shown in large samples from Mississippi. The range of *C. d. ludovicianus* is limited to the Alluvial Fault Basin in Louisiana. No other specimens have been found in the United States to compare in cephalic portion of the cephalothorax length/areola length ratio and color pattern of this subspecies. Statistical values based on morphological features are advocated by the author for subspeciation differences within this group of crawfish.

57. Mazlum Y, Eversole AG. 2004. Observations on the Life Cycle of *Procambarus acutus acutus* in South Carolina Culture Ponds. Aquaculture 238(1-4): 249-261.

Abstract: *Procambarus acutus acutus* population structure and reproductive development was evaluated during the dry-culture (Aug-Sep) and the wet-culture phases (Nov-Jun) in 0.1-ha culture ponds. Two cohorts of

crayfish, carryover (CO) crayfish and young-of-the-year (YOY) crayfish were present in the ponds. Young-of-the year crayfish grew throughout the 233-day wet-culture phase, averaging 0.19-mm total length (TL)/day, while CO crayfish growth occurred only during 3 of the 8-monthly sampling periods. The fastest growth occurred in fall (Nov-Dec) and spring (Apr-May) for YOY, and in March for CO crayfish. Form-I males were present in each of the wet- and dry-culture samples. Females excavated from burrows during the dry-culture phase possessed significantly greater gonadosomatic indices (GSIs) and less hepatopancreas moisture (HM) than females sampled during the wet-culture phase. Larger females, designated as CO individuals, burrowed earlier and exhibited more advanced gonad development than the smaller YOY females. Individuals of both designated cohorts oviposited eggs; however, attached young were observed only on the excavated CO crayfish. Pleopod eggs per female increased linearly with crayfish TL; however, those crayfish held in cups in the laboratory oviposited significantly more eggs than the females excavated from burrows. Crayfish held in cups oviposited 96% of the eggs in their ovaries. The life cycle traits of P a. acutus limit the harvest to one recruitment wave in South Carolina culture ponds. Copyright 2004 Elsevier B.V. All rights reserved.

58. McClain WR. 2000. Effect of levee reconstruction and rainfall on crawfish, *Procambarus clarkii*, emergence from burrows. Journal of Applied Aquaculture 10(2): 27-40.

59. Mcmahon BR. 1993. Adaptations of Oxygen Uptake and Transport in Burrowing Crayfish. Am Zool 33(5): 52A.

60. Mcmahon BR. 2001. Respiratory and Circulatory Compensation to Hypoxia in Crustaceans. Respir Physiol 128(3): 349-364.

Abstract: Crustaceans are often tolerant of hypoxic exposure and many regulate O_2 consumption at low ambient O_2. In acute hypoxia, most increase branchial water flow, and many also increase branchial haemolymph flow, both by an increase in cardiac output and by shunting flow away from the viscera. The O_2-binding affinity of crustacean O_2 carriers increases in hypoxic conditions, as a result of hyperventilation induced alkalosis. In chronic hypoxic exposure some crustaceans do not sustain high ventilatory pumping levels but increased effectiveness of O_2-uptake across the gills is maintained as a result of the build up of metabolites such as lactate and urate which also function to increase the haemocyanin O_2-binding affinity. Chronic exposure to hypoxia also may increase O_2-binding capacity and promote the synthesis of new high O_2-affinity carrier molecules. Exposure to untenable rates or levels of O_2 depletion causes many decapodan crustaceans to surface and ventilate the gills with air. Burrowing crayfish provide an example of animals, which excel in all these mechanisms. Control mechanisms involved in compensatory responses to hypoxia are discussed.

61. McManus LR. 1960. An Occurrence of "Chimney" Construction by the Crayfish *Cambarus b. bartoni*. Ecology 41(2): 383-384.

62. Miller MF, Hasiotis ST, Babcock LE, Isbell JL, Collinson JW. 2001. Tetrapod and Large Burrows of Uncertain Origin in Triassic High Paleolatitude Floodplain Deposits, Antarctica. Palaios 16(3): 218-232.

Abstract: Two types of large diameter burrows, recognized by non-overlapping size distributions, occur in high paleolatitude floodplain deposits of the Lower Triassic Fremouw Formation, Shackleton Glacier area, Antarctica. Type G (giant) burrows are gently dipping tunnels 8 to 19 cm in diameter. Type L (large) burrows are 2 to 6.5 cm in diameter, curved or subhorizontal tunnels that rarely branch; scratch markings on both burrow types generally are parallel or tangential to the long axis of the burrows. Type G burrows are interpreted as produced by tetrapods based on similarity in size, architecture, and surface markings to Permian burrows from South Africa that contain complete skeletons of therapsids. These are the first tetrapod burrows described from Antarctica. Type L burrows have characteristics of both fossil tetrapod and crayfish burrows, precluding identification of an unique producer. Triassic tetrapods, including therapsids, that lived in high southern latitudes probably burrowed to dampen the effects of seasonal environmental fluctuations, just as do many of their mammalian counterparts living today in high latitudes. The paleolatitudinal and paleooclimatic distributions of burrowing therapsids and their mammalian descendents can be assessed by focusing search efforts on very large burrows, and by identifying producers using criteria delineated herein; this will clarify the extent to which the burrowing habit originated and persisted in high latitudes.

63. Miltner M, Avault JWJr. 1981. Rice and millet as forages for crawfish. Louisiana Agriculture 24(3): 8-10.

Abstract: In Louisiana, USA in early June 24 ponds of 0.05 ha (0.125 acre) were drained slowly to allow red swamp crayfish (*Procambarus clarkii*) to burrow and reproduce. In mid June just after draining, and on 1st August, 45 days after draining, 6 ponds were planted with rice 1165 lb/acre and 6 with Japanese millet (*Echinochloa frumentacea*) 842 lb/acre as sprouted seeds. At planting time the late-sown ponds were weeded and watered but no pond was cultivated or fertilized. Forage was either left standing or it was cut with a rotary mower on 28th September and the cut forage was left among the 5-in stubble. Ponds were flooded on 6th October and crawfish were trapped from 10th January to 19th May. Yield of crawfish was significantly greater than for any other treatment, with rice planted early and not cut. With that treatment the mean forage biomass was 1.03 kg/m^2, significantly greater than for any other treatment; mean lodging and decomposition rates of the forage were intermediate and the mean dissolved oxygen content of the water at dawn was 4.1/106. Yield of crawfish was generally less with millet than with rice. Millet produced 20 to 50% less forage than rice, lodged more rapidly and decomposed more slowly and less completely. The slower lodging of rice provided a continuous supply of feed. It was known that forage becomes nutritionally complete after decomposing to carbon:nitrogen 17:1 or less. Millet retained a high ratio from February to May, when crawfish depended most on detritus; rice had a lower ratio and continued to decompose throughout the study. Standing forage gave better water quality, more surface area for growth of periphyton, extended its use as feed or substrate further into the season than did cut forage, and allowed separation of the crawfish. No treatment gave ample feed late in the season, from mid March to May inclusive, and it may be possible to use several plant species chosen to lodge and decompose at different rates.

64. Morey J, Hollis G. 1997. Australia's Most Diverse Crayfish Habitat? Memoirs of the Museum of Victoria 56(2): 667-669.

Abstract: Labertouche Creek, a tributary of the Tarago River in West Gippsland, arguably has the most diverse freshwater crayfish assemblage in Australia. Six crayfish species are known from the creek, including the rare and vulnerable Warragul Burrowing Crayfish, Engaeus sternalis, the only known location of this species in Australia (Horwitz, 1990, 1992). Other species of burrowing crayfish found are *E. hemicirratulus*, *E. cunicularius*, and *E. quadrimanus*. Two species of *Euastacus* (Spiny Freshwater Crayfish) are also known from these waters, *Euastacus yarraensis* and *E. kershawi* (Gippsland Spiny Crayfish). A third species, *E. woiwuru*, is possibly present, as the creek is shown to be within this species' range.

65. Nakata K, Hamano T, Hayashi K-I, Kawai T. 2003. Water Velocity in Artificial Habitats of the Japanese Crayfish *Cambaroides japonicus*. Fisheries Science (Tokyo) 69(2): 343-347.

Abstract: The appropriate water velocity in artificial burrows for the Japanese crayfish species *Cambaroides japonicus* was studied. An experimental system of two artificial burrows (burrows A and B) of the same size was set in a large tank. The velocity of burrow A was 0 cm/s and that of burrow B was varied and set at 0 cm/s, 5 cm/s, 10 cm/s, 20 cm/s and 30 cm/s. The selection of these two burrows by *C. japonicus* was observed. No animals selected burrow B significantly more than burrow A above 10 cm/s. At 20 cm/s, some crayfishes were swept away and could not return to burrows because of the high water velocity. At 30 cm/s, most animals were swept away. We conclude that the appropriate water velocity for the suitability of artificial burrows and the immediate foraging area adjacent to the burrows should be as low as 5 cm/s.

66. Nakata K, Hamano T, Hayashi K-I, Kawai T, Goshima S. 2001. Artificial Burrow Preference by the Japanese Crayfish *Cambaroides japonicus*. Fisheries Science (Tokyo) 67(3): 449-455.

Abstract: Preference for artificial burrows by the endangered Japanese crayfish species *Cambaroides japonicus* was studied to improve its cultivation. The occupation of artificial burrows, which were made from straight polyvinyl chloride pipes of different internal diameters (Y, mm), by crayfishes of different total lengths (X, mm) was significantly ($P<0.001$, $n=56$) described by a linear regression: $Y=0.49X+3.42$ (19.0ltoreqXltoreq70.2). Among burrows of different lengths (crayfish total length (TL) X1, X2, X3, and X4), crayfishes significantly preferred burrows that were greater than TLX3 ($P<0.001$, $n=588$).

67. Nakata K, Ota T, Hamano T. 2003. Artificial Burrow Preference by the Signal Crayfish *Pacifastacus leniusculus* (Dana, 1852). Journal of National Fisheries University 51(2): 59-65.

Abstract: Preference for artificial burrows by the signal crayfish *Pacifastacus leniusculus* (Dana, 1852) was investigated. The occupation of artificial burrows, which were made of grey coloured straight polyvinyl chloride pipes of different internal diameters (Y, mm), by crayfishes of different total length (X, mm) was significantly described by a linear regression: Y=0.68 X-8.56, (39.0ltoreqXltoreq78.0). Among burrows of different length (crayfish total length (TL) X1, X2, X3, and X4), crayfishes significantly preferred the particular lengths, mainly gtoreqTLX2. An interspecific relation between *P. leniusculus* and an endangered Japanese crayfish species *Cambaroides japonicus* (de Haan, 1841) was discussed by comparing these results to a previous study of the artificial burrow preference by *C. japonicus*.

68. Norrocky MJ. 1984. Burrowing Crayfish Trap. Ohio Journal of Science 84(1): 65-66.

The paper describes the construction and use of a trap for capturing burrowing crayfish at their burrow entrance without destroying the crayfish's burrow. A 13% capture rate was recorded for *Cambarus diogenes* and *Fallicambarus fodiens*. Other species captured were *Procambarus clarkii*, *Orconectes rusticus*, *Orconectes immunis*, and *Cambarus bartonii cavatus*

69. Norrocky MJ. 1991. Observations on the Ecology Reproduction and Growth of the Burrowing Crayfish *Fallicambarus fodiens* (Decapoda, Cambaridae) in North-Central Ohio, USA. American Midland Naturalist 125(1): 75-86.

Abstract: Breeding (form I) and nonbreeding (Form II) males were present throughout the year. Occupancy of the same burrow by Form I males and females occurred from April to late October. Eggs were extruded, developed eyed embryo stage by mid-October and overwintered in this condition. Hatching occurred in late March to mid-April. Subadults in November were 20 mm-30 carapace length (CL). Molting to adult occurred in the following summer or autumn. Maximum age was over 6 yr and maximum size was 49.3 mm CL. Growth per molt was quite variable; adults averaged 1.39 mm CL. Burrow temperature range form near 2 C in February to near 22 C in August at a depth of 106 cm. Coinhabiting and burrow-sharing were inter- and intraspecific, involved members of the same or opposite sex and on occasion involved more than two crayfish.

70. Ortmann AE. 1906. A Case of Isolation without 'Barriers'. Science 23(587): 504-506.

71. Payette AL, Mcgaw IJ. 2003. Thermoregulatory Behavior of the Crayfish *Procambarus clarkii* in a Burrow Environment. Comparative Biochemistry and Physiology Part a Molecular & Integrative Physiology 136A(3): 539-556.

Abstract: The behavioral thermoregulation of the red swamp crayfish, *Procambarus clarkii*, was investigated in its burrow environment. In the field, air and water temperatures within crayfish burrows fluctuated less compared with surface temperatures in the Mojave Desert. However, crayfish could still experience sub-optimal temperature regimes inside burrows. In the laboratory, *P. clarkii* heated and cooled more rapidly in water than in air. In a thermal gradient, the crayfish selected a water temperature of 22° C and avoided water temperatures above 31° C and below 12° C. Observations of behavior in an artificial burrow showed that *P. clarkii* displayed three main shuttling behaviors between water and air in response to temperature. The number of bilateral emersions and emigrations, as well as the amount of time spent in air (in a 24 h period), were significantly greater at 34° C than at 12, 16, 22 or 28° C. This reflected an increased use of the behavioral thermoregulation at temperatures approaching the critical thermal maximum of this species. Upon migrating from 34° C water into 38° C air, crayfish body temperature decreased significantly. These periods of emersion were interspersed with frequent dipping in the water, allowing the crayfish to gain the benefits of evaporative cooling, without the physiological costs incurred by long-term exposure to air.

72. Penn GH, Marlow G. 1959. The Genus *Cambarus* in Louisiana (Decapoda, Astacidae). American Midland Naturalist 61(1): 191-203.

73. Powell ML, Watts SA. 2001-2002. Survivor: the Energetics of Crayfish in Burrows. Am Zool 40(6):1177.

Abstract: *Procambarus clarkii* (PC) and *P. zonangulus* (PZ) share overlapping ranges in the southeastern United States. Within this shared range the success of each species varies, possibly related to the ability to survive environmental challenges and extended periods of nutrient deprivation during the summer when both species retreat to burrows. Metabolic rate, proximate composition and energy content were determined for adult male crayfish during a five-month starvation period. The pattern and source of nutrients utilized during starvation varied between species. In PZ 75% of the tail muscle and 30% of the hepatopancreas was mobilized during the starvation period, compared to 60% of both the tail muscle and hepatopancreas in PC. Although a greater percentage of the dry tissue was mobilized from the tail and hepatopancreas of both species, over 50% of the total dry material was mobilized from the remaining carcass. Nutrient utilization in both species was tissue-specific; the hepatopancreas mobilized a greater percentage of lipid, and tail muscle a greater percentage of protein. PC mobilized almost twice as much energy as PZ, but from different tissues. PC mobilized 8% of the energy from the hepatopancreas, 14% from the tail and 78% from the carcass. PZ mobilized 14% of the energy from the hepatopancreas, 59% from the tail and only 27% from the carcass. Survivorship was 45% for PC and 71% of PZ. These different responses to nutrient deprivation may partially explain the observed changes in species composition in ponds.

74. Punzalan D, Guiasu RC, Belchior D, Dunham DW. 2001. Discrimination of Conspecific-Built Chimneys From Human-Built Ones by the Burrowing Crayfish, *Fallicambarus fodiens* (Decapoda, Cambaridae). Invertebrate Biology 120(1): 58-66.

Abstract: The vast majority of tested juvenile crayfish of Fallicambarus fodiens consistently preferred conspecific-built mud chimneys over similar-looking human-built chimneys. When the chimneys were surrounded by transparent acetate sheets, the crayfish no longer discriminated between conspecific-built and human-built chimneys. This suggests that visual cues were not important in allowing the crayfish to discriminate between the two chimney types. In the absence of chimneys, significantly more crayfish showed an initial preference for mud saturated with water that had contained conspecifics, over similar mud saturated with distilled water. This indicates that chemical cues play a role in allowing these crayfish to discriminate between the conspecific-conditioned mud and the control wet mud. The preference of *F. fodiens* individuals for conspecific-built chimneys appears to be based, at least in part, on chemical cues, possibly in addition to tactile cues.

75. Rach JJ, Bills TD. 1989. Crayfish Control With Traps and Largemouth Bass. Progressive Fish-Culturist 51(3): 157-160.

Abstract: We attempted to control a population of papershell crayfish (*Orconectes immunis*) in a 11-hectare fish-rearing impoundment in Jackson County, Wisconsin, [USA] by using traps and by stocking largemouth bass (*Micropterus salmoides*). Crayfish were harvested with traps during the summer in 1985, and the pond was stocked with 386 largemouth bass (mean weight, 1.1 kg) in spring 1986. The pond was drained in the fall of 1985 and 1986, and crayfish burrow counts were made to estimate the population. In 1985, we trapped more than 18,000 crayfish, of which 72% were adult males. Trapping had minor effect on the young-of-the-year crayfish. In 1986, the crayfish population was reduced by 98%, predation by largemouth bass being the probable major cause of the reduction.

76. Ranta E, Lindstrom K. 1992. Power to Hold Sheltering Burrows by Juveniles of the Signal Crayfish, *Pasifastacus eniusculus*. Ethology 92(3): 217-226.

Abstract: Juveniles of the signal crayfish reside during daylight hours in shelters. At twilight they leave for food, at daybreak they either return or find another shelter. We examined conflicts over burrow ownership. At low densities with equal numbers of shelters and crayfish 1/5 of the burrows were occupied. Increasing both the number of crayfish and shelters improved the occupancy close to 50%. Doubling the number of crayfish in relation to the number of shelters increased the occupancy up to 75%. In an experiment with 30 randomly selected crayfish and 15 sheltering holes available the burrow holders were about 1-2 mm longer in carapace length than those found freely moving in the aquarium. Shelter owners were rarely newly moulted individuals. Size asymmetry (2 mm difference in carapace length) between owner and intruder affected the outcome of the contest over burrow ownership. When intruders were larger than owners, takeovers occurred in about 80% of the cases tested. If the owner was large and the intruder small the takeover frequency was about 20%. When the owner and the intruder were of matching size takeovers were still observed in about 45% of the cases. The outcome of the ownership contest has a true meaning. In a nursery-pond experiment, where low-protein food was randomly scattered all around, no size differences were found in carapace lengths of crayfish juveniles residing in different shelters. However, when high-protein food was introduced in a single spot, owners, of burrows were significantly larger and more numerous in the nearby shelters than in the shelters furthest away from the food source. Therefore, when food is unevenly distributed the burrow ownership contests may potentially lead to size asymmetries between individuals. This may lead to large individuals nearby the food growing faster than small individuals. This may lead to large individuals nearby the food growing faster than small individuals further away from the food source, a process likely to further enhance size differences.

77. Richardson AMM. 1983. The Effect of the Burrows of a Crayfish *Parastacoides tasmanicus* on the Respiration of the Surrounding Soil. Soil Biology and Biochemistry 15(3): 239-242.

Abstract: The CO_2 production of soil samples taken from around 5 burrows of the crayfish, P. *tasmanicus*, living in peat soil in southwestern Tasmania, was measured by gas chromatography. Respiration rate per unit dry weight of soil varied significantly between burrows, between samples taken from the upper and lower parts of the burrows and between samples taken further into the soil laterally from the edge of the burrows. When expressed per unit of organic content, respiration rate differed significantly only in samples taken progressively further away from the burrow edge. The burrow apparently provides a shorter diffusion path for gases, ameliorating anaerobic conditions in the surrounding soil, encouraging the growth of fungi and rootlets, and consequently increasing the respiration rate.

78. Richardson AMM, Swain R. 1980. Habitat Requirements and Distribution of *Engaeus cisternarius* and 3 Subspecies of *Parastacoides tasmanicus* (Decapoda, Parastacidae) Burrowing Crayfish From an Area of Southwestern Tasmania Australia. Australian Journal of Marine and Freshwater Research 31(4): 475-484.

Abstract: During an extensive survey of the crayfish fauna of the lower catchments of the Gordon River, southwestern Tasmania, 2 spp. of crayfish were collected: *E. cisternarius* and 3 ssp. of *P. tasmanicus* (*P. t. tasmanicus*, *P. t. inermis* and *P. t. insignis*). From this survey and an intensive study in a small area of the Olga River valley, distinct habitat preferences of each form were recognized. *E. cisternarius* was restricted to the area north and west of the Gordon River where it was found only in clay and sandy soils under rainforest. *P. t. tasmanicus* was found in waterlogged soils, peats and sands on valley floors covered either with wet sedgeland or rainforest. *P. t. inermis* was found in 2 disjunct habitats: well-drained slopes and hillsides covered in health vegetation, and under rocks in small creeks in rainforests. *P. t. insignis* occupied an intermediate habitat between *P. t. tasmanicus* and the non-creek dwelling *P. t. inermis*, but was restricted geographically to the extreme southwest of the study area. The taxonomic status of the *P. tasmanicus* subspecies was discussed.

79. Robertson KM , Johnson DL. 2004. Vertical Redistribution of Pebbles by Crayfish in Mollisol Catenas of Central Illinois. Soil Science 169(11): 776-786.

Abstract: Soil mixing by organisms (bioturbation) has an important influence on the distribution of rock fragments in soils. In east-central Illinois, pebbles were observed on the surfaces of loessal catenas. We hypothesized that surface pebbles are brought to the surface from the underlying glacial drift by burrowing crayfish. We predicted that (i) the spatial distribution of surface pebbles on catenas reflects crayfish habitat, (ii) pebbles are at least as abundant in crayfish chimneys (surface mound structures) as in the surrounding topsoil, (iii) pebbles are no larger than the cross-sectional diameter of crayfish burrows, (iv) the distribution of pebbles with regard to size class and material type does not differ between chimneys and surface soil samples, and (v) the vertical distribution of pebbles in the soil will reflect vertical mixing rather than a concentration at the soil surface. To test these predictions, surface pebbles were compared among catena members and crayfish chimneys and soil cores were collected and analyzed for pebble content and characteristics at multiple sites. The vertical distribution of pebbles in the soil-profile was also studied at one site, and results were largely consistent with the hypothesis. However, the vertical distribution of pebbles suggested that near-surface pebbles subside at a greater rate than they are vertically mixed by crayfish, presumably due to bioturbation by other soil organisms. The study underscores the need to consider the influence of biota in addition to physical factors in interpreting the typically complex pathways of pedogenesis.

80. Rudolph E. 1997. Physiochemical Aspects of the Habitat and Burrows Morphology of the Burrowing Crayfish *Parastacus nicoleti* (Philippi, 1882) (Decapoda, Parastacidae) in the South of Chile. Gayana Zoologia 61(2): 97-108.

Abstract: The burrowing crayfish, *Parastacus nicoleti* (Philippi, 1882), inhabits swampy grounds in the Valdivia and Osorno provinces (39degree to 41° S) in the south of Chile. The present work describes physicochemical aspects of the habitat e.g., temperature, pH, hardness, dissolved oxygen along with structure of burrows of *P. nicoleti*. From June 1991 to June 1992 a population next to San Jose de la Mariquina (39°33' S; 73°03' W) was monitored monthly. *P. nicoleti* builds relatively complex burrows on grounds with predominance of fine particles (very fine sand, thick slime and fine slime more clay). While the water temperature of the burrows varied less than 1.6° C, from 9 to 18 hours, the atmospheric temperature varied up to 9.3° C. The lowest mean water temperature recorded in the burrows was 8.5° C and the highest was 17.5° C. The water pH ranged between 5.8 and 6.6, the hardness ($CaCO_3$) between 22.3 and 44.5 ppm and the dissolved oxygen between 1.0 and 4.7 mg/l. Total rainfall during the study period was 1958.5 mm. The possible adaptive advantage of the burrowing behaviour of *P. nicoleti* is discussed.

81. Rudolph E, Verdi A, Tapia J. 2001. Intersexuality in the Burrowing Crayfish *Parastacus varicosus* Faxon, 1898 (Decapoda, Parastacidae). Crustaceana (Leiden) 74(1): 27-37.

Abstract: The problem of intersexuality was studied in the burrowing crayfish, *Parastacus varicosus*, by examining sexual characters of 142 specimens from Uruguay. It was demonstrated that all specimens had supernumerary gonopores, with a masculine or feminine gonad, from which gonoducts of both sexes emerged toward the respective gonopores. Under 22.6 mm of standard cephalothoracic length (SCL), all specimens (N = 105) had the same external morphology. However, dissection showed that their gonads were already differentiated, and it was found that 57.1% of the specimens were intersex females and the remaining percentage were intersex males. Thirty-seven individuals with a SCL equal or superior to 22.6 mm were found. Of these, 14 (37.8%) were intersex males, and presented the same external morphology that characterized the specimens of sizes under 22.6 mm. The remaining 23 specimens (62.2%) were intersex females, nine of which presented the secondary sexual characters associated with egg incubation. A possible explanation for this type of intersexuality is given.

82. Rudolph EH. 1995. Partial Protandric Hermaphroditism in the Burrowing Crayfish *Parastacus nicoleti* (Philippi, 1882) (Decapoda: Parastacidae). Journal of Crustacean Biology 15(4): 720-732.

Abstract: The question of intersexuality and hermaphroditism was investigated in the burrowing crayfish *Parastacus nicoleti* (Philippi, 1882) by examination of sexual characters of 473 specimens from Chile. Six sexual forms were initially identified, on the basis of the presence and absence of gonopores in the coxae of the third and fifth pair of pereiopods. Two basic sexual types were found in this species, primary females and protandric hermaphrodites, the latter consisting of 1 male-phase and 3 female-phase forms - 1 transitional form and 2 female-phase forms - which originate from protandric hermaphrodites in male phase, through 2 slightly different ways. Permanent secondary sexual characters associated with incubation of eggs were identified in adult primary females and in the 2 protandric forms in female phase. Both the gene-dispersal model and the size-advantage model may be used to explain different aspects of this partial protandric hermaphroditism.

83. Rudolph EH, Rojas CS. 2003. Embryonic and Early Postembryonic Development of the Burrowing Crayfish, *Virilastacus araucanius* (Faxon, 1914) (Decapoda, Parastacidae) under Laboratory Conditions. Crustaceana (Leiden) 76(7): 835-850.

Abstract: The stages and duration of the embryonic and early postembryonic development of the burrowing crayfish, *Virilastacus araucanius* are described, in water at temperatures between 10.0 and 21.0degreeC, with 8.5 to 9.0 mg/l of dissolved oxygen, pH 6.8 to 8.5, and hardness of 49.8 ppm $CaCO_3$. The morphological changes observed on the egg surface allow to distinguish 5 embryonic stages. After hatching, two moults separate three juvenile stages. The first two juvenile stages lack uropods and remain attached to the female. In stage 3, the juvenile is similar to the adult, both in morphology and behaviour, and becomes independent from the mother. Embryonic development lasts 120 days, and the postembryonic stages take another 20 days until the emergence of juvenile stage 3. The development is direct, with incubation of large eggs, rich in yolk, and parental care over juvenile stages 1 and 2.

84. Schuster GA. 1976. A New Primary Burrowing Crayfish of the Subgenus *Jugicambarus* (Decapoda, Cambaridae) From Kentucky, USA, with Notes on Its Life History. American Midland Naturalist 95(1): 225-230.

85. Stone EL. 1993. Soil Burrowing and Mixing by a Crayfish. Soil Science Society of America Journal 57(4): 1096-1099.

Abstract: Observation of rapid lateral water flow through, rather than over, the surface of a level, clayey, mixed, thermic Typic Albaquult (Bladen series) prompted study of the abundant burrows of a crayfish, *Procambarus rogersi rogersi* Hobbs. The area was a 20-yr-old experimental plantation of slash pine (*Pinus elliottii* Engelm. var. *elliottii*), with a wide range in tree growth, ground vegetation, and O-horizon thickness. The objective was to better understand the elaborate macropore system and its consequences for mixing the surface layers of a very poorly drained soil where other burrowing animals were lacking. Excavation of burrows and burrow casts revealed galleries, 4 to 10 cm in diameter, > 1.5 m long, chiefly in the upper 30 cm of soil but with vertical shafts to > 1 m in depth. Fifty to 80% of randomly located 0.1-m-2 subplots in well-forested plots had from one to five openings through the mineral soil surface into surficial burrows, demonstrating widespread distribution of the latter. Bands of rock phosphate broadcast on the surface 20 yr previously provide a marker of cumulative mixing; almost one-half of the residual P had been mixed into the 5- to 15-cm depth by crayfish activity.

86. Stone EL, Comerford NB. 1994. Plant and animal activity below the solum. Whole Regolith Pedology: Proceedings of a Symposium, Minneapolis, Minnesota, 3 Nov. 1992: 57-74.

Abstract: The exploitation by roots and some animals of the regolith below a depth of 1.5m is reviewed. Observations of rooting depths of a number of species are presented. Three categories of water uptake opportunities by roots are outlined: uptake from water tables and their capillary fringes by phreatophytes which tap groundwater at some depth as well as other species, including lucerne and many tree species; uptake from unconsolidated regolith, with a great number of species, notably perennials, utilising water well below 1.5m, as demonstrated by studies of water depletion; and uptake from saprolite and weathered fractured rock, as indicated by the presence of roots and channels in road cuts and quarries work. The problems of assessing solute uptake by deep roots are considered and the role of deep roots in the uptake of macronutrients discussed. It is considered that depth does not limit root symbionts, although research is limited. The effects of vertebrate burrowing are discussed, while a review of invertebrate research focuses on crayfish, earthworms, beetles, and termites; little research is available on animal population or geomorphological influence. It is concluded that assumptions about shallow rooting and depths of biotic activity have been inaccurate and the implications of this are considered. 118 ref.

87. Swain R, Marker PF, Richardson AMM. 1987. Respiratory Responses to Hypoxia in Stream-Dwelling *Astacopsis franklinii* and Burrowing *Parastacoides tasmanicus* Parastacid Crayfish. Comparative Biochemistry and Physiology a 87(3): 813-818.

Abstract: Respiratory responses to hypoxia, described for the first time in Parastacidae, are qualitatively similar to those found in Astacidae and Cambaridae. During progressive hypoxia, oxygen consumption, heart rate and scaphognathite rate were higher in the stream-dwelling *Astacopsis franklinii* than in the burrowing *Parastacoides tasmanicus*. The critical oxygen tension was estimated as 30 and 40 mm Hg in *Parastacoides* and *Astacopsis*, respectively. Following maintainedhypoxia, branchial ventilation rates decreased in both species, extraction efficiencies increased, whilst the convection requirement increased. Both physiological and behavioural adaptations are considered important in enabling *Parastacoides* to survive the prolonged periods of hypoxia that occur within its burrows.

88. Swain R, Marker PF, Richardson AMM. 1988. Comparison of the Gill Morphology and Branchial Chambers in Two Fresh-Water Crayfishes From Tasmania Australia *Astacopsis franklinii* and *Parastacoides tasmanicus*. Journal of Crustacean Biology 8(3): 355-363.

Abstract: Branchial complements, gill morphology, gill surface areas, gill volumes, branchial volumes, and branchial space of the stream-dwelling parastacid crayfish *Astacopis franklinii* and the burrowing *Parastacoides tasmanicus* are compared. A reduction in gill number in *Parastacoides* results from the absence of

pleurobranchiae on the fifth, sixth, and seventh thoracic segments and the extreme reduction of the pleurobranch on segment 8. There is a tendency for gill filaments to be longer in *Parastacoides* and the terminal spines on the filaments of the podobranchiae are longer, hooked rather than straight, and occur more frequently in this species. Most of the respiratory exchange area is provided by the podobranchiae. Linear regression equations (log transformed data) describing the allometric relationship between body size and gill area, gill volume branchial volume and branchial space are provided for both species. *Parastacoides* has a significantly greater size-related gill area and branchial volume than Astacopsis and, since there are no differences in gill volume, there is also a significant increase in branchial space. Much of this additional space appears to be created towards the posterior of the branchial chamber. The differences between the two species are interpreted as adaptations for the burrowing, amphibious life-style adopted by *Parastacoides*. We suggest that they serve primarily to facilitate oxygen uptake, reduce the tendency for the gills to become clogged, and aid in flushing of the branchial chamber in hypoxic waters with a very high particle content; they are seen as providing secondary benefits to assist survival during the often prolonged periods when the burrows lack free water.

89. Taylor CA, Anton TG. 1999. Distributional and Ecological Notes on Some of Illinois' Burrowing Crayfishes. Transactions of the Illinois State Academy of Science 92(1-2): 137-145.

Abstract: Recent field work has shown the prairie or grassland crayfish, *Procambarus gracilis*, to occur commonly in forested regions of northeastern Illinois and the digger crayfish, *Fallicambarus fodiens*, to persist in similar habitats of that same region. In addition, a search of major museum holdings revealed a new drainage record for *F. fodiens* in Illinois. Both results demonstrate that there is still much to learn about Illinois decapod crustaceans and highlight the need for continued research.

90. Trepanier TL, Dunham DW. 1999. Burrowing and Chimney Building by Juvenile Burrowing Crayfish *Fallicambarus fodiens* (Cottle, 1863) (Decapoda, Cambaridae). Crustaceana (Leiden) 72(4): 435-442.

91. Williams DD, Williams NE, Hynes HBN. 1974. Observations on the Life History and Burrow Construction of the Crayfish *Cambarus fodiens* in a Temporary Stream in Southern Ontario. Can J Zool 52(3): 365-370.

Future Monitoring Recommendations

Future monitoring recommendations

Option 1 - Preferred (High intensity) monitoring plan: The highest intensity monitoring program would be to conduct this study every ten years by re-sampling all of the 2004-2007 sites visited in this project. Sampling could be extended over the intervening period with 65 sites sampled each year. Even at the highest level of monitoring intensity it does not seem reasonable to repeat this study's level of work more than once every decade. It is thought to be highly unlikely that detectable changes could occur in shorter than a 10-year time period. If dramatic changes in precipitation should occur, higher or lower (possible global warming issues), serious consideration should be given to re-sampling sites established in this study as soon as possible. By conducting a portion of the monitoring each year over a 10-year period, a new evaluation could be conducted any year it is deemed necessary, especially if some dramatic change should transpire. It is still thought that soil conditions should be exerting some level of influence on burrowing crayfish abundance. A one-year period of revisiting the sites sampled for this study and an on-site examination of soil composition with detailed records of water table and surface water status at each site could yield the information that would resolve the question of soil influence on burrowing crayfish abundance. Soil data could also be collected over the proposed ten-year re-sampling period proposed above. A separate multiyear (2-3) study of burrowing crayfish populations focused on their association with rare and endangered species (R&E), especially vertebrates, could be conducted during the seasons such species are expected to be occupying crayfish burrows, and in areas these species are known to inhabit. In combination with this study's results, such a separate study would greatly enhance IDNR's management capabilities for R&E species. It was found in this study that a burrow scope was an effective method of examining crayfish burrows for larger inhabitants (such as snakes or frogs) with minimal disturbance levels.

Advantages/disadvantages: The advantage of conducting the three aforementioned studies would be an improvement in database quality (soils), increased understanding of R&E species life history requirements, and a greater likelihood of detecting changes in Indiana's crayfish abundance and distribution patterns. The value of the database could be greatly increased at a minimal cost by adding site-specific soil and seasonally targeted R&E species data. Sampling 65 sites a year would likely involve a 6- or 7-week field effort. To assess all sites for site-specific soil condition and water table status would likely take all of one field season to conduct.

Option 2 - Conservative (Medium intensity) monitoring plan: A random selection of base study sites to form a 50% subset of the original sites that would be sampled every ten years could form a medium level monitoring plan. Over a ten-year span 32 sites would need to be sampled each year. As sites are revisited soil and water table data could be collected.

Advantages/disadvantages: The main advantage of a medium intensity monitoring effort is a reduction in cost. Sampling 32 sites over a summer field season would likely require 2 to 3 weeks field work by a two person crew given that there would be considerable distance between sampling sites and time would be needed to drive between sites. The disadvantage of this approach is that it would take ten years to possibly resolve the soil/crayfish relationship issue and it does not address R&E species associations with crayfish burrows.

Option 3 - Maintenance (Low intensity) monitoring plan: A random selection of base study sites to form a 25% subset of the original sites is thought to be the minimum number of sites that could yield a sufficient database for assessing changes in distribution and abundance in Indiana's crayfish community. A total of 161 sites would need to be sampled over a ten-year period at a rate of 16 sites/year. As sites are revisited, soil and water table data could be collected.

Advantages/disadvantages: The main advantage of a low intensity monitoring effort is a further reduction in cost. Sampling 16 sites over a summer would likely require only 2 weeks field work by a two person crew, again given that there would be considerable distance between sampling sites and time would be needed to drive between sites. The main disadvantage is that it is not certain that this low level of effort will yield a database with the power needed to detect changes that may occur or be occurring. Again, as sites are revisited soil and water table data could be collected so it would again take a ten-year period to possibly resolve the soil/crayfish relationship issue. It is even more likely that data from only 161 sites would not yield the data needed to obtain the answer.

Appendix 1

Task 1

Base Study

Table A-1. Soil types associated with ***Fallicambarus fodiens*** in Indiana

MUID	MUNAME
IN004	BLOUNT-GLYNWOOD-MORLEY (IN004)
IN005	BLOUNT-PEWAMO-GLYNWOOD (IN005)
IN013	CROSBY-TREATY-MIAMI (IN013)
IN030	NOLIN-HAYMOND-PETROLIA (IN030)
IN037	FINCASTLE-BROOKSTON-MIAMIAN (IN037)
IN054	MIAMIAN-CELINA-CROSBY (IN054)
IN092	HOSMER-ZANESVILLE-STENDAL (IN092)
IN101	MARKLAND-UNIONTOWN-MCGARY (IN101)
IN110	STENDAL-BONNIE-BIRDS (IN110)

Table A-2. Soil types associated with ***Procambarus gracilis*** in Indiana

MUID	MUNAME
IN001	COLOMA-SPINKS-OSHTEMO (IN001)
IN002	GILFORD-MAUMEE-SPARTA (IN002)
IN004	BLOUNT-GLYNWOOD-MORLEY (IN004)
IN006	MORLEY-MARKHAM-ASHKUM (IN006)
IN039	MIAMI-MIAMIAN-XENIA (IN039)
IN060	RUSSELL-HENNEPIN-XENIA (IN060)
IN082	WAKELAND-HAYMOND-WILBUR (IN082)

Table A-3. Soil types associated with ***Cambarus diogenes*** in Indiana

MUID	MUNAME
IN001	COLOMA-SPINKS-OSHTEMO (IN001)
IN002	GILFORD-MAUMEE-SPARTA (IN002)
IN003	RENSSELAER-DARROCH-WHITAKER (IN003)
IN004	BLOUNT-GLYNWOOD-MORLEY (IN004)
IN005	BLOUNT-PEWAMO-GLYNWOOD (IN005)
IN006	MORLEY-MARKHAM-ASHKUM (IN006)
IN007	RIDDLES-CROSIER-OSHTEMO (IN007)
IN013	CROSBY-TREATY-MIAMI (IN013)
IN016	MIAMI-WAWASEE-CROSIER (IN016)
IN018	RENSSELAER-AUBBEENAUBBEE-MARKTON (IN018)
IN019	HOUGHTON-ADRIAN-CARLISLE (IN019)
IN020	CRAIGMILE-SUMAN-PROCHASKA (IN020)
IN025	SEBEWA-GILFORD-HOMER (IN025)
IN026	FOX-OCKLEY-WESTLAND (IN026)
IN027	ELDEAN-OCKLEY-SLEETH (IN027)
IN028	MARTINSVILLE-WHITAKER-RENSSELAER (IN028)
IN029	SAWMILL-LAWSON-GENESEE (IN029)
IN030	NOLIN-HAYMOND-PETROLIA (IN030)
IN031	HUNTINGTON-NEWARK-WOODMERE (IN031)
IN032	HOYTVILLE-NAPPANEE-BLOUNT (IN032)
IN034	SWYGERT-BRYCE-CHATSWORTH (IN034)
IN037	FINCASTLE-BROOKSTON-MIAMIAN (IN037)
IN039	MIAMI-MIAMIAN-XENIA (IN039)
IN040	MIAMI-CROSBY-TREATY (IN040)

Table A-3. cont. Soil types associated with ***Cambarus diogenes*** in Indiana

IN044	DRUMMER-TORONTO-WINGATE (IN044)
IN054	MIAMIAN-CELINA-CROSBY (IN054)
IN064	REESVILLE-RAGSDALE-UNIONTOWN (IN064)
IN078	WESTLAND-SLEETH-OCKLEY (IN078)
IN080	HAYMOND-WAKELAND-PEKIN (IN080)
IN082	WAKELAND-HAYMOND-WILBUR (IN082)
IN083	CINCINNATI-BONNELL-ROSSMOYNE (IN083)
IN085	CINCINNATI-ROSSMOYNE-HICKORY (IN085)
IN086	NEGLEY-PARKE-CHETWYND (IN086)
IN088	BLOOMFIELD-PRINCETON-AYRSHIRE (IN088)
IN089	EDEN-SWITZERLAND-EDENTON (IN089)
IN091	ALFORD-SYLVAN-IONA (IN091)
IN092	HOSMER-ZANESVILLE-STENDAL (IN092)
IN096	LYLES-PATTON-HENSHAW (IN096)
IN097	DUBOIS-OTWELL-PEOGA (IN097)
IN100	ZIPP-VINCENNES-EVANSVILLE (IN100)
IN101	MARKLAND-UNIONTOWN-MCGARY (IN101)
IN103	ZANESVILLE-WELLSTON-GILPIN (IN103)
IN104	WELLSTON-BERKS-GILPIN (IN104)
IN108	CINCINNATI-TRAPPIST-JENNINGS (IN108)
IN109	HICKORY-CINCINNATI-BERKS (IN109)
IN110	STENDAL-BONNIE-BIRDS (IN110)
IN112	CRIDER-BAXTER-BEDFORD (IN112)
IN114	WHEELING-ELKINSVILLE-VINCENNES (IN114)

Table A-4. Soil types associated with ***Cambarus polychromatus*** in Indiana

MUID	**MUNAME**
IN001	COLOMA-SPINKS-OSHTEMO (IN001)
IN002	GILFORD-MAUMEE-SPARTA (IN002)
IN003	RENSSELAER-DARROCH-WHITAKER (IN003)
IN004	BLOUNT-GLYNWOOD-MORLEY (IN004)
IN005	BLOUNT-PEWAMO-GLYNWOOD (IN005)
IN006	MORLEY-MARKHAM-ASHKUM (IN006)
IN007	RIDDLES-CROSIER-OSHTEMO (IN007)
IN012	CROSIER-BROOKSTON-BARRY (IN012)
IN013	CROSBY-TREATY-MIAMI (IN013)
IN015	WOLCOTT-ODELL-CORWIN (IN015)
IN016	MIAMI-WAWASEE-CROSIER (IN016)
IN017	METEA-MARKTON-CROSIER (IN017)
IN019	HOUGHTON-ADRIAN-CARLISLE (IN019)
IN021	OSHTEMO-KALAMAZOO-HOUGHTON (IN021)
IN022	SPINKS-HOUGHTON-BOYER (IN022)
IN023	ELSTON-WARSAW-SHIPSHE (IN023)
IN026	FOX-OCKLEY-WESTLAND (IN026)
IN027	ELDEAN-OCKLEY-SLEETH (IN027)
IN029	SAWMILL-LAWSON-GENESEE (IN029)
IN030	NOLIN-HAYMOND-PETROLIA (IN030)
IN032	HOYTVILLE-NAPPANEE-BLOUNT (IN032)
IN033	MONTGOMERY-STROLE-LENAWEE (IN033)
IN037	FINCASTLE-BROOKSTON-MIAMIAN (IN037)
IN039	MIAMI-MIAMIAN-XENIA (IN039)
IN040	MIAMI-CROSBY-TREATY (IN040)
IN041	MIAMI-STRAWN-HENNEPIN (IN041)

Table A-4. cont. Soil types associated with ***Cambarus polychromatus*** in Indiana

IN042	RUSSELL-MIAMI-XENIA (IN042)
IN047	MILLSDALE-NEWGLARUS-RANDOLPH (IN047)
IN050	ELLIOTT-ASHKUM-VARNA (IN050)
IN051	BARCE-MONTMORENCI-DRUMMER (IN051)
IN053	MILFORD-MARTINTON-DEL REY (IN053)
IN054	MIAMIAN-CELINA-CROSBY (IN054)
IN056	PATTON-DEL REY-CROSBY (IN056)
IN058	MIAMI-FINCASTLE-XENIA (IN058)
IN060	RUSSELL-HENNEPIN-XENIA (IN060)
IN062	SAYBROOK-DRUMMER-PARR (IN062)
IN063	RUSSELL-ALFORD-REESVILLE (IN063)
IN064	REESVILLE-RAGSDALE-UNIONTOWN (IN064)
IN069	WARSAW-LORENZO-DAKOTA (IN069)
IN070	ROCKFIELD-FINCASTLE-CAMDEN (IN070)
IN074	MAHALASVILLE-STARKS-CAMDEN (IN074)
IN078	WESTLAND-SLEETH-OCKLEY (IN078)
IN080	HAYMOND-WAKELAND-PEKIN (IN080)
IN081	AVA-CINCINNATI-ALFORD (IN081)
IN082	WAKELAND-HAYMOND-WILBUR (IN082)
IN083	CINCINNATI-BONNELL-ROSSMOYNE (IN083)
IN085	CINCINNATI-ROSSMOYNE-HICKORY (IN085)
IN086	NEGLEY-PARKE-CHETWYND (IN086)
IN089	EDEN-SWITZERLAND-EDENTON (IN089)
IN091	ALFORD-SYLVAN-IONA (IN091)
IN092	HOSMER-ZANESVILLE-STENDAL (IN092)
IN095	HOSMER-STOY-HICKORY (IN095)
IN097	DUBOIS-OTWELL-PEOGA (IN097)
IN098	PEOGA-BARTLE-HOSMER (IN098)
IN101	MARKLAND-UNIONTOWN-MCGARY (IN101)
IN101	MARKLAND-UNIONTOWN-MCGARY (IN101)
IN103	ZANESVILLE-WELLSTON-GILPIN (IN103)
IN104	WELLSTON-BERKS-GILPIN (IN104)
IN106	LYLES-AYRSHIRE-BLOOMFIELD (IN106)
IN107	SELMA-ARMIESBURG-VINCENNES (IN107)
IN108	CINCINNATI-TRAPPIST-JENNINGS (IN108)
IN109	HICKORY-CINCINNATI-BERKS (IN109)
IN110	STENDAL-BONNIE-BIRDS (IN110)
IN112	CRIDER-BAXTER-BEDFORD (IN112)
IN113	CORYDON-CANEYVILLE-GILPIN (IN113)
IN114	WHEELING-ELKINSVILLE-VINCENNES (IN114)

Table A-5. Soil types associated with ***Cambarus ortmanni*** in Indiana

MUID	MUNAME
IN001	COLOMA-SPINKS-OSHTEMO (IN001)
IN004	BLOUNT-GLYNWOOD-MORLEY (IN004)
IN005	BLOUNT-PEWAMO-GLYNWOOD (IN005)
IN006	MORLEY-MARKHAM-ASHKUM (IN006)
IN013	CROSBY-TREATY-MIAMI (IN013)
IN021	OSHTEMO-KALAMAZOO-HOUGHTON (IN021)
IN026	FOX-OCKLEY-WESTLAND (IN026)
IN027	ELDEAN-OCKLEY-SLEETH (IN027)
IN029	SAWMILL-LAWSON-GENESEE (IN029)
IN031	HUNTINGTON-NEWARK-WOODMERE (IN031)
IN037	FINCASTLE-BROOKSTON-MIAMIAN (IN037)

Table A-5 cont. Soil types associated with ***Cambarus ortmanni*** in Indiana

IN039	MIAMI-MIAMIAN-XENIA (IN039)
IN040	MIAMI-CROSBY-TREATY (IN040)
IN042	RUSSELL-MIAMI-XENIA (IN042)
IN047	MILLSDALE-NEWGLARUS-RANDOLPH (IN047)
IN053	MILFORD-MARTINTON-DEL REY (IN053)
IN054	MIAMIAN-CELINA-CROSBY (IN054)
IN060	RUSSELL-HENNEPIN-XENIA (IN060)
IN083	CINCINNATI-BONNELL-ROSSMOYNE (IN083)
IN089	EDEN-SWITZERLAND-EDENTON (IN089)

Table A-6. Soil types associated with no crayfish captured in Indiana

MUID	MUNAME
IN001	COLOMA-SPINKS-OSHTEMO (IN001)
IN002	GILFORD-MAUMEE-SPARTA (IN002)
IN004	BLOUNT-GLYNWOOD-MORLEY (IN004)
IN007	RIDDLES-CROSIER-OSHTEMO (IN007)
IN016	MIAMI-WAWASEE-CROSIER (IN016)
IN019	HOUGHTON-ADRIAN-CARLISLE (IN019)
IN021	OSHTEMO-KALAMAZOO-HOUGHTON (IN021)
IN022	SPINKS-HOUGHTON-BOYER (IN022)
IN025	SEBEWA-GILFORD-HOMER (IN025)
IN026	FOX-OCKLEY-WESTLAND (IN026)
IN029	SAWMILL-LAWSON-GENESEE (IN029)
IN030	NOLIN-HAYMOND-PETROLIA (IN030)
IN040	MIAMI-CROSBY-TREATY (IN040)
IN044	DRUMMER-TORONTO-WINGATE (IN044)
IN050	ELLIOTT-ASHKUM-VARNA (IN050)
IN056	PATTON-DEL REY-CROSBY (IN056)
IN075	GRANBY-ZADOG-MAUMEE (IN075)
IN076	KENTLAND-CONRAD-ZABOROSKY (IN076)
IN081	AVA-CINCINNATI-ALFORD (IN081)
IN081	AVA-CINCINNATI-ALFORD (IN081)
IN086	NEGLEY-PARKE-CHETWYND (IN086)
IN103	ZANESVILLE-WELLSTON-GILPIN (IN103)

Table A-7. Locality records for *Cambarus polychromatus* recorded for the base study 2004-2007.											
OSU	**INBSC**	**Genus**	**Species**	**Total**	**Field No**	**Date**	**County**	**Township**	**Locality**	**Lat**	**Long**
	1701	Cambarus	polychromatus	7	RFT2005059	7/28/05	TIPTON	CICERO	C.R. 500 W, 3.53 MI SW OF TIPTON	40.2730	-86.1069
6446		Cambarus	polychromatus	3	RFT07004	6/19/07	Union	Harrison	unnamed trib of Smith Creek, bridge on Co Rd. 200E, NW of Witts Station,	39.7253	-84.8900
6443		Cambarus	polychromatus	4	RFT07008	6/19/07	Fayette	Jennings	Village Creek, bridge on CO Rd. 450E, N of Alquina,	39.6250	-85.0540
6441		Cambarus	polychromatus	5	RFT07001	6/18/07	Union	Union	Indian Creek, bridge on Brookville road, 2.0 mi. S of West College Corner,	39.5405	-84.8249
6439		Cambarus	polychromatus	1	RFT07006	6/19/07	Union	Brownsville	unnamed trib of Richland Creek, bridge on CO Rd. 250W, NE of Brownsville,	39.6630	-84.9743
6447		Cambarus	polychromatus	1	RFT07013	6/20/07	Fayette	Posey	unnamed trib of Shawnee Creek, bridge on CO Rd. 800E, N of Fairview,	39.7178	-85.3011
6436		Cambarus	polychromatus	6	RFT07010	6/19/07	Fayette	Connersville	Fall Creek, bridge on CO Rd. 150S & 525W, E of Glenwood,	39.6207	-85.2381
6432		Cambarus	polychromatus	2	RFT07009	6/19/07	Fayette	Connersville	Little Williams Creek, bridge on IN Rt. 44, W of Connersville,	39.6323	-85.2192
6455		Cambarus	polychromatus	5	RFT07007	6/19/07	Union	Liberty	unnamed trib of Brookville Lake, bridge on CO Rd. 500W, E of Alquina,	39.6154	-85.0167
6465		Cambarus	polychromatus	3	RFT07002	6/18/07	Union	Harrison	Nutter Creek, bridge on CO Rd 400E, NW of Goodwins Corner,	39.6640	-84.8529
6461		Cambarus	polychromatus	1	RFT07014	6/20/07	Fayette	Posey	Symons Creek, bridge on CO Rd. 350W, NE of Bentonville,	39.7797	-85.2023
6458		Cambarus	polychromatus	5	RFT07005	6/19/07	Union	Brownsville	Clay Creek, bridge on North Philomath Road, S of Philomath,	39.7137	-85.0170
6448		Cambarus	polychromatus	2	RFT07003	6/18/07	Union	Harrison	unnamed trib of Church Creek, bridge on IN Rt. 224, NE of Kitchel,	39.6972	-84.8381
6454		Cambarus	polychromatus	6	RFT07011	6/20/07	Fayette	Orange	unnamed trib of North Branch Garrison Creek, bridge on West Fielding Road (CO Rd. 150S), SE of Glenwood,	39.6175	-85.2869
6452		Cambarus	polychromatus	5	RFT07012	6/20/07	Fayette	Fairview	unnamed trib of Williams Creek, bridge on CO Rd. 50N, NE of Glenwood,	39.6501	-85.2605
6451		Cambarus	polychromatus	11	RFT07018	6/21/07	KOSCIUSKO	Clay	outlet of Carr Lake, bridge on private drive, N of Claypool,	41.1602	-85.8620
6450		Cambarus	polychromatus	5	RFT07017	6/21/07	KOSCIUSKO	Harrison	Dorsey Ditch, bridge on CO Rd. 25S, SW of Atwood,	41.2281	-86.0080
6449		Cambarus	polychromatus	5	RFT07019	6/21/07	KOSCIUSKO	Clay	unnamed trib of Muskellunge Lake, culvert on CO Rd. 700S, W of Claypool,	41.1306	-85.8266
6467		Cambarus	polychromatus	1	RFT07020	8/6/07	Hancock	Brandywine	Weber Ditch at intersection (SW corner) of Meridian Rd. and CO Rd. 200 S, [2.58 mi. SW of Greenfield, 3.17 mi. SE of Spring Lake],	39.7564	-85.8005
6470		Cambarus	polychromatus	5	RFT07021	8/7/07	Hancock	Blue River	Sixmile Creek at bridge on Co. Rd. 300 S [SE of Greenfield, W of Carthage],	39.7422	-85.6396
6473		Cambarus	polychromatus	3	RFT07022	8/7/07	Hancock	Center	Little Brandywine Creek in pasture and upstream bridge on Co. Rd. 200 S [SE of Greenfield, SW of Riley],	39.7588	-85.7451
6478		Cambarus	polychromatus	2	RFT07023	8/7/07	Hancock	Green	Baretts Ditch at bridge on IN Rt. 234 [E of Eden, N of Arrowhead],	39.9012	-85.7659
6479		Cambarus	polychromatus	2	RFT07024	8/7/07	Hancock	Brown	Shirley Drain at bridge on Co Rd 1125 E [SW of Shirley, E of Wilkinson],	39.8853	-85.5912
6481		Cambarus	polychromatus	2	RFT07025	8/7/07	Hancock	Center	unnamed ditch tributary to Little Brandywine Creek at bridge on US Rt 40 [E of Greenfield, NW of Westland],	39.7876	-85.7147
	3416	Cambarus	polychromatus	2	TPS05125	6/2/05	SCOTT	JENNINGS	SR 256,, 1.25 MI E OF AUSTIN	38.7431	-85.7809
	1140	Cambarus	polychromatus	23	BC04118	7/20/04	MARTIN	HALBERT	C.R. 225 BRIDGE, 1.1 MI ESE SHOALS	38.6619	-86.7727
	1142	Cambarus	polychromatus	1	BC04121	7/20/04	MARTIN	HALBERT	C.R. 67 BRIDGE, OFF S.R. 650 AT U.S. GYPSUM TURN RIGHT, 3RD BRIDGE, 3.8 MI ENE SHOALS	38.6791	-86.7170
	1145	Cambarus	polychromatus	2	BC04124	7/20/04	MARTIN	HALBERT	S.R. 650 BRIDGE, 3.4 MI S HURON	38.6842	-86.7147
	1148	Cambarus	polychromatus	6	BC04125	7/21/04	MARTIN	HALBERT	C.R. 67 BRIDGE, 3.3 MI SW HURON	38.6792	-86.7169

Table A-7. Locality records for *Cambarus polychromatus* cont.
2227

OSU	INBSC	Genus	Species	Total	Field No	Date	County	Township	Locality	Lat	Long
	2224	Cambarus	polychromatus	4	JLB06031	6/7/06	KNOX	WIDNER	FREELANDVILLE RD, FREELANDVILLE	38.8582	-87.3604
		Cambarus	polychromatus	1	JLB06032	5/11/06	KNOX	WIDNER	KERNS RD, FREELANDVILLE	38.8428	-87.3654
	2230	Cambarus	polychromatus	3	JLB06033	6/5/06	KNOX	WIDNER	BB RD, FREELANDVILLE	38.8705	-87.3342
	1075	Cambarus	polychromatus	3	LR04016	9/13/04	ORANGE	PAOLI	SPRING MILL ROAD BRIDGE, 1.4 MI WNW CHAMBERSBURG	38.5249	-86.4200
1084	1077	Cambarus	polychromatus	1	LR04021	9/13/04	ORANGE	PAOLI	C.R. 125 W, 3.0 MI SSW PAOLI	38.5040	-86.4563
	1078	Cambarus	polychromatus	3	LR04024	6/24/04	ORANGE	PAOLI	S ELM STREET BRIDGE, 1.2 MI W PAOLI	38.5559	-86.4748
	1081	Cambarus	polychromatus	3	LR04034	6/24/04	ORANGE	PAOLI	LOG CREEK ROAD (C.R. 350 W), 3.0 MI SW PAOLI	38.5428	-86.5213
619		Cambarus	polychromatus	2	LR04040	6/24/04	ORANGE	ORANGEVILLE	C.R. 500 W BRIDGE, 3.8 MI NE WEST BADEN SPRINGS	38.5929	-86.5526
	1131	Cambarus	polychromatus	23	LR04111	9/1/04	MARTIN	LOST RIVER	C.R. 111, 1.9 MI N WINDOM	38.5990	-86.8021
666		Cambarus	polychromatus	1	RFT04001	5/19/04	MONROE	BLOOMINGTON	CASCADE PK. BRIDGE, 2.0 MI NW BLOOMINGTON	39.1983	-86.5373
680	623	Cambarus	polychromatus	2	RFT04002	5/19/04	MONROE	VAN BUREN	HARMONY RD. BRIDGE, 2.2 MI NE BLOOMINGTON	39.1081	-86.6097
707		Cambarus	polychromatus	1	RFT04017	6/17/04	LAPORTE	SPRINGFIELD	C.R. 925 N, NE MICHIGAN CITY	41.7406	-86.7546
		Cambarus	polychromatus	4	RFT04021	6/28/04	JASPER	CARPENTER	C.R. 1800 S, 2.0 MI ESE GOODLAND	40.7512	-87.2542
		Cambarus	polychromatus	2	RFT04034	6/30/04	ST JOSEPH	CLAY	KINTZ AVE., N SOUTH BEND	41.7179	-86.2348
	713	Cambarus	polychromatus	1	RFT04037	7/1/04	ELKHART	HARRISON	C.R. 32, W GOSHEN	41.5801	-85.9292
	719	Cambarus	polychromatus	19	RFT04039	7/1/04	ELKHART	WASHINGTON	C.R. 23, S BRISTOL	41.6978	-85.8325
730	726	Cambarus	polychromatus	1	RFT04047	8/2/04	PARKE	ADAMS	U.S. 36, W HOLLANDSBURG/BELLMORE	39.7576	-87.1305
	728	Cambarus	polychromatus	5	RFT04048	8/2/04	PARKE	JACKSON	BIG ROCKY FORK COVERED BRIDGE, 1.5 MI SE OF MANSFIELD	39.6628	-87.0807
		Cambarus	polychromatus	9	RFT04049	8/3/04	PARKE	WASHINGTON	C.R. 80 E, S MARSHALL	39.8390	-87.1927
	734	Cambarus	polychromatus	3	RFT04050	8/3/04	PARKE	GREENE	S.R. 59, 1.0 MI SE GUION	39.8350	-87.1044
	739	Cambarus	polychromatus	7	RFT04052	8/3/04	VERMILLION	CLINTON	S.R. 163 BRIDGE, 1.0 MI E BLANFORD	39.6653	-87.4989
	742	Cambarus	polychromatus	5	RFT04053	8/3/04	VERMILLION	CLINTON	C.R. 200 W, 1.0 MI E WEST CLINTON	39.6953	-87.5024
	743	Cambarus	polychromatus	27	RFT04054	8/4/04	VERMILLION	HELT	C.R. 1150 S, N CLINTON	39.7183	-87.4320
	747	Cambarus	polychromatus	6	RFT04056	8/4/04	VERMILLION	EUGENE	C.R. 150 W, S CAYUGA	39.9381	-87.4932
	748	Cambarus	polychromatus	8	RFT04057	8/4/04	VERMILLION	EUGENE	WEST JACKSON ST. BRIDGE, W EUGENE	39.9645	-87.4943
	750	Cambarus	polychromatus	25	RFT04058	8/4/04	PARKE	LIBERTY	C.R 1200 N BRIDGE, N SYLVANIA	39.9409	-87.2874
	753	Cambarus	polychromatus	5	RFT04060	8/5/04	WARREN	JORDAN	C.R. 900 W, S TAB	40.3716	-87.4914
	757	Cambarus	polychromatus	55	RFT04061	8/5/04	WARREN	LIBERTY	W DIVISION RD., N WEST LEBANON	40.3166	-87.3737
	760	Cambarus	polychromatus	7	RFT04062	8/5/04	FOUNTAIN	SHAWNEE	U.S. 41 BRIDGE, N ROB ROY	40.2422	-87.2433
	762	Cambarus	polychromatus	5	RFT04063	8/5/04	WARREN	KENT	COAL RUN RD., NW COVINGTON	40.2076	-87.4380
	763	Cambarus	polychromatus	2	RFT04064	8/5/04	FOUNTAIN	VAN BUREN	S.R. 136 BRIDGE, S STONE BLUFF	40.1320	-87.3528
	874	Cambarus	polychromatus	1	RFT04064	8/5/04	FOUNTAIN	VAN BUREN	S.R. 136 BRIDGE, S STONE BLUFF	40.1320	-87.3528
	765	Cambarus	polychromatus	4	RFT04065	8/6/04	FOUNTAIN	VAN BUREN	C.R. 60 E, 1.0 MI S STONE BLUFF	40.1602	-87.2560

Table A-7. Locality records for *Cambarus polychromatus* cont.

~~771~~ OSU	INBSC	Genus	Species	Total	Field No	Date	County	Township	Locality	Lat	Long
774	768	Cambarus	polychromatus	8	RFT04066	8/6/04	FOUNTAIN	CAIN	C.R. 200 S, SW HILLSBORO	40.0966	-87.1928
		Cambarus	polychromatus	7	RFT04068	8/9/04	TIPPECANOE	UNION	C.R. 600 S BRIDGE, SW TAYLOR	40.3215	-87.9786
		Cambarus	polychromatus	5	RFT04069	8/9/04	TIPPECANOE	WAYNE	C.R. 650 S, N ODELL	40.3230	-87.0668
~~784~~	777	Cambarus	polychromatus	5	RFT04071	8/10/04	WARREN	PINE	S.R. 26, NW PINE VILLAGE	40.4619	-87.3251
	779	Cambarus	polychromatus	7	RFT04072	8/10/04	WARREN	ADAMS	C.R. 450 E BRIDGE, N CHATTERTON	40.4652	-87.2354
787	782	Cambarus	polychromatus	7	RFT04073	8/10/04	WARREN	ADAMS	C.R. 600 E AND C.R. 550 N INTERSECTION,	40.3967	-87.2062
790		Cambarus	polychromatus	3	RFT04074	8/10/04	TIPPECANOE	SHEFFIELD	C.R. 1075 E BRIDGE, SW WYANDOT	40.3284	-86.7006
797		Cambarus	polychromatus	1	RFT04075	8/10/04	TIPPECANOE	SHEFFIELD	C.R. 550 S AND C.R. 500 E, SE NORTH CRANE	40.3379	-86.8095
798		Cambarus	polychromatus	3	RFT04076	8/11/04	TIPPECANOE	SHEFFIELD	C.R. 800 S, S STOCKWELL	40.3017	-86.7639
		Cambarus	polychromatus	2	RFT04079	8/11/04	WHITE	WEST POINT	C.R. 700 W BRIDGE, SE SEAFIELD	40.7237	-87.0049
~~809~~		Cambarus	polychromatus	3	RFT04080	8/11/04	WHITE	WEST POINT	C.R. 450 W BRIDGE, W SMITHSON	40.7094	-86.9566
~~814~~	804	Cambarus	polychromatus	1	RFT04082	8/12/04	WHITE	BIG CREEK	S.R. 43 BRIDGE, N CHALMERS	40.7013	-86.8716
	806	Cambarus	polychromatus	4	RFT04083	8/12/04	WHITE	MONON	C.R. 1000 N BRIDGE, E LEE	40.8983	-86.7912
818		Cambarus	polychromatus	3	RFT04085	8/12/04	CARROLL	JEFFERSON	C.R. 70 W BRIDGE, N DELPHI	40.6804	-86.6590
		Cambarus	polychromatus	6	RFT04086	8/13/04	CARROLL	TIPPECANOE	TECUMSEH BEND RD., S SANDY BEACH	40.6054	-86.7482
		Cambarus	polychromatus	2	RFT04088	8/13/04	CARROLL	BURLINGTON	C.R. 500 E, SW CARROLLTON	40.5077	-86.4303
~~2966~~	2958	Cambarus	polychromatus	2	RFT06004	5/29/06	CASS	CLAY	C.R. 100 N, 2.79 MI NW OF NEW WAVERLY	40.7794	-86.2424
	2960	Cambarus	polychromatus	4	RFT06005	5/29/06	CASS	CLAY	C.R. 45 E, 3.64 MI NE OF LOGANSPORT	40.7683	-86.2874
2969	2963	Cambarus	polychromatus	1	RFT06006	5/30/06	CASS	JACKSON	C.R. 1000 E, 1.99 MI NW OF GALVESTON	40.6041	-86.1844
		Cambarus	polychromatus	3	RFT06007	5/30/06	CASS	DEER CREEK	C.R. 200 E & C.R. 950 S, 2.87 MI NE OF DEER CREEK	40.6267	-86.3360
2977 ~~2979~~		Cambarus	polychromatus	3	RFT06008	5/30/06	CASS	JEFFERSON	NEAR MOUTH W/ WABASH RIVER, 3.55 MI NW OF CLYMORS	40.7300	-86.5102
~~2981~~	2973	Cambarus	polychromatus	5	RFT06009	5/30/06	CASS	BOONE	S.R. 16, 1.07 MI W OF ROYAL CENTER	40.8671	-86.5206
		Cambarus	polychromatus	4	RFT06010	5/30/06	CASS	BETHLEHEM	C.R. 200 E, 2.21 MI NW OF METEA	40.8923	-86.3383
		Cambarus	polychromatus	3	RFT06011	5/31/06	MIAMI	PIPE CREEK	C.R. 400 S, 3.94 MI NE OF ONWARD	40.7071	-86.1215
		Cambarus	polychromatus	6	RFT06012	5/31/06	MIAMI	PIPE CREEK	C.R. 100 W, 2.25 MI SW OF PERU	40.7263	-86.0921
	2983	Cambarus	polychromatus	3	RFT06013	5/31/06	MIAMI	HARRISON	C.R. 950 S, 2.58 MI NW OF AMBOY	40.6301	-86.9605
	2985	Cambarus	polychromatus	3	RFT06014	5/31/06	MIAMI	PERU	S.R. 19, 4.00 MI NE OF PERU	40.8068	-86.0385
	3070	Cambarus	polychromatus	6	RFT06015	5/31/06	MIAMI	ERIE	C.R. 200 N, 5.33 MI NE OF PERU	40.7936	-85.9822
	3072	Cambarus	polychromatus	8	RFT06016	5/31/06	MIAMI	RICHLAND	C.R. 580 E, 3.15 MI SW OF ROANN	40.8787	-85.9658
	3076	Cambarus	polychromatus	8	RFT06017	6/1/06	MIAMI	ALLEN	C.R. 25 W, 2.44 MI W OF MACY	40.9648	-86.0181
	3079	Cambarus	polychromatus	4	RFT06018	6/1/06	WABASH	NOBLE	LAGRO ROAD, D/S CITY DUMP, 2.45 MI NE OF WABASH	40.8177	-85.7827

Table A-7. Locality records for *Cambarus polychromatus* cont.											
OSU	**INBSC**	**Genus**	**Species**	**Total**	**Field No**	**Date**	**County**	**Township**	**Locality**	**Lat**	**Long**
	3082	Cambarus	polychromatus	6	RFT06019	6/1/06	WABASH	NOBLE	SOUTH BAILEY ROAD, 2.18 MI SE OF WABASH	40.7814	-85.7967
	3084	Cambarus	polychromatus	7	RFT06020	6/1/06	WABASH	NOBLE	DORA ROAD, 2.38 MI SE OF WABASH	40.7923	-85.7829
	3085	Cambarus	polychromatus	3	RFT06021	6/1/06	WABASH	CHESTER	C.R. 400 E, 2.37 MI E OF NORTH MANCHESTER	40.9938	-85.7220
3114	3088	Cambarus	polychromatus	8	RFT06022	6/1/06	WABASH	LAGRO	ROCK SPRINGS PIKE, 4.81 MI NW OF ANDREWS	40.9072	-85.6712
	3091	Cambarus	polychromatus	2	RFT06023	6/2/06	WABASH	WALTZ	S.R. 13, 5.08 MI S OF WABASH	40.7301	-85.8283
3116	3111	Cambarus	polychromatus	5	RFT06024	6/5/06	WABASH	LAGRO	S.R. 124, 1.92 MI SE OF LINCOLNVILLE	40.7406	-85.6467
3119		Cambarus	polychromatus	3	RFT06025	6/5/06	HUNTINGTON	LANCASTER	C.R. 200 S, 1.11 MI SE HARIANSBURG	40.7996	-85.5561
3122		Cambarus	polychromatus	3	RFT06026	6/6/06	HUNTINGTON	JACKSON	C.R. 900 N, 3.63 MI W OF ROANOKE	40.9609	-85.4419
3125		Cambarus	polychromatus	4	RFT06027	6/6/06	HUNTINGTON	HUNTINGTON	S.R. 9 & OLD S.R. 9, 3.19 MI SW OF HUNTINGTON	40.8421	-85.5266
3128		Cambarus	polychromatus	1	RFT06028	6/6/06	HUNTINGTON	LANCASTER	S.R. 5, 6.86 MI N OF WARREN	40.7801	-85.4558
3131		Cambarus	polychromatus	1	RFT06029	6/6/06	HUNTINGTON	ROCK CREEK	C.R. 300 E, 1.68 MI SE OF TOLEDO	40.7953	-85.3930
		Cambarus	polychromatus	4	RFT06030	6/7/06	HUNTINGTON	SALAMONIE	S.R. 5, 2.79 MI S OF MAJENICA	40.7321	-85.4406
3136		Cambarus	polychromatus	1	RFT06031	6/7/06	HUNTINGTON	SALAMONIE	S.R. 218, 2.77 MI SE OF WARREN	40.6540	-85.3903
	3133	Cambarus	polychromatus	6	RFT06032	6/7/06	WELLS	LIBERTY	C.R. 500 S, 2.26 MI SW OF LIBERTY CENTER	40.6689	-85.2986
3141 3145		Cambarus	polychromatus	1	RFT06033	6/7/06	WELLS	ROCK CREEK	C.R. 200 N, 4.23 MI SE OF MARKLE	40.7710	-85.3089
	3139	Cambarus	polychromatus	1	RFT06034	6/8/06	WELLS	UNION	C.R. 300 W, 5.67 MI NW OF UNIONDALE	40.9073	-85.2801
		Cambarus	polychromatus	3	RFT06035	6/8/06	WELLS	JEFFERSON	C.R. 800 N & C.R. 650 E, 2.06 MI N OF TOCSIN	40.8593	-85.1007
3164		Cambarus	polychromatus	3	RFT06036	6/8/06	WELLS	LANCASTER	C.R. 600 E, 1.97 MI S OF TOCSIN	40.8014	-85.1085
	3157	Cambarus	polychromatus	3	RFT06042	6/19/06	ADAMS	PREBLE	C.R. 900 N, 5.15 MI SW OF WILLIAMS	40.8749	-85.0559
	3161	Cambarus	polychromatus	4	RFT06043	6/19/06	ADAMS	PREBLE	C.R. 750 N, 5.72 MI SW OF WILLIAMS	40.8533	-85.0441
		Cambarus	polychromatus	5	RFT06044	6/19/06	ADAMS	PLEASANT	PLEASANT CENTER ROAD BRIDGE, 2.01 MI S OF BAERFIELD	40.9600	-85.1924
	3167	Cambarus	polychromatus	2	RFT06045	6/20/06	ADAMS	ROOT	NW WINCHESTER ROAD, 1.41 MI NW OF DECATUR CENTER	40.8470	-84.9460
	3170	Cambarus	polychromatus	10	RFT06046	6/20/06	ADAMS	UNION	C.R. 950 N, 5.96 MI SW OF CONVOY, OHIO	40.8854	-84.8069
	3173	Cambarus	polychromatus	1	RFT06047	6/20/06	ADAMS	UNION	C.R. 1000 N, 6.32 MI NE OF DECATUR	40.8919	-84.8389
3184	3176	Cambarus	polychromatus	1	RFT06048	6/20/06	ALLEN	MONROE	RIDER ROAD, 1.11 MI SW OF DIXON	40.9439	-84.8249
	3179	Cambarus	polychromatus	5	RFT06049	6/20/06	ALLEN	JACKSON	S.R. 101, 2.91 MI N OF MONROEVILLE	41.0168	-84.8637
	3181	Cambarus	polychromatus	7	RFT06050	6/20/06	ALLEN	JACKSON	S.R. 14, 2.09 MI W OF EDGERTON	41.0742	-84.8452
3188 3192		Cambarus	polychromatus	8	RFT06051	6/21/06	ALLEN	WASHINGTON	NORTHWEST PASSAGE TRAIL, 3.95 MI SE OF HUNTERTOWN	41.1757	-85.1374
	3186	Cambarus	polychromatus	8	RFT06052	6/21/06	ALLEN	ST JOSEPH	MEADOWBROOK DRIVE, 7.83 MI SE OF HUNTERTOWN	41.1307	-85.0951
		Cambarus	polychromatus	6	RFT06053	6/21/06	ALLEN	ADAMS	MEYER ROAD, 3.94 MI SW OF NEW HAVEN	41.0381	-85.0770
		Cambarus	polychromatus	7	RFT06055	6/21/06	WHITLEY	CLEVELAND	WEST RIVER ROAD, 2.63 MI SW OF SOUTH WHITLEY	41.0704	-85.6744

Table A-7. Locality records for *Cambarus polychromatus* cont.											
OSU	**INBSC**	**Genus**	**Species**	**Total**	**Field No**	**Date**	**County**	**Township**	**Locality**	**Lat**	**Long**
3202 3205	3194	Cambarus	polychromatus	6	RFT06056	6/22/06	WHITLEY	WASHINGTON	WASHINGTON ROAD, 3.15 MI NW OF LAUD	41.0586	-85.5094
	3199	Cambarus	polychromatus	1	RFT06058	6/22/06	WHITLEY	COLUMBIA	C.R. 400 W, 3.47 MI SE OF LARWILL	41.1558	-85.5678
		Cambarus	polychromatus	7	RFT06059	6/22/06	WHITLEY	JEFFERSON	C.R. 400 E, 2.41 MI NE OF LAUD	41.0660	-85.4131
		Cambarus	polychromatus	5	RFT06060	6/22/06	WHITLEY	JEFFERSON	PRIVATE DRIVE OFF C.R. 700 S, 3.75 MI NE OF LAUD	41.0649	-85.3843
	3208	Cambarus	polychromatus	6	RFT06061	6/23/06	KOSCIUSKO	CLAY	PRIVATE DRIVE OFF C.R. 400 S, 3.48 MI NE OF CLAYPOOL	41.1715	-85.8498
	3209	Cambarus	polychromatus	7	RFT06062	6/23/06	KOSCIUSKO	WAYNE	E ARTHUR STREET, 9.60 MI S OF LEESBURG	41.2445	-85.8426
3215 3220 3223	3210	Cambarus	polychromatus	20	RFT06063	7/5/06	HENRY	HARRISON	INTERSECTION OF C.R. 300 W & C.R. 200 N, 2.39 MI NE OF CADIZ	39.9609	-85.4434
	3213	Cambarus	polychromatus	4	RFT06064	7/5/06	HENRY	LIBERTY	EAST BROWN ROAD, 3.09 MI SE OF HILLSBORO	39.9468	-85.2797
		Cambarus	polychromatus	6	RFT06065	7/5/06	WAYNE	JEFFERSON	S.R. 1, 1.29 MI NE OF HAGERSTOWN	39.9237	-85.1429
		Cambarus	polychromatus	6	RFT06066	7/5/06	WAYNE	JEFFERSON	WEST SWOVELAND ROAD, 2.89 MI W OF GREENS FORK	39.8884	-85.0964
		Cambarus	polychromatus	2	RFT06067	7/6/06	HENRY	GREENSBORO	C.R. 250 S, 1.48 MI N OF GREESBORO	39.8954	-85.4585
	3225	Cambarus	polychromatus	4	RFT06068	7/6/06	HENRY	HENRY	PARK ROAD (C.R. 275 W), JUST SOUTH OF PARK ENTRANCE, 2.28 MI NE OF GREENSBORO	39.9007	-85.4381
	3227	Cambarus	polychromatus	11	RFT06069	7/6/06	HENRY	HENRY	C.R. 200 S, 3.27 MI SW OF NEW CASTLE	39.9012	-85.4133
	3229	Cambarus	polychromatus	3	RFT06070	7/6/06	HENRY	SPICELAND	U.S. 40, 1.23 MI NE OF KNIGHTSTOWN	39.8027	-85.5042
	3233	Cambarus	polychromatus	7	RFT06071	7/6/06	HENRY	DUDLEY	C.R. 425 E, 2.54 MI E OF LEWISVILLE	39.8026	-85.3054
	3238	Cambarus	polychromatus	5	RFT06072	7/6/06	WAYNE	JACKSON	EAST MILTON ROAD, 6.33 MI NW OF WATERLOO	39.7872	-85.1509
	3243	Cambarus	polychromatus	4	RFT06073	7/6/06	WAYNE	CENTER	SHOEMAKER ROAD, 1.5 MI SE OF CENTERVILLE	39.7990	-85.9749
	3244	Cambarus	polychromatus	1	RFT06074	7/7/06	WAYNE	CLAY	N CARLOS ROAD, 4.74 MI W OF WEBSTER	39.9033	-85.0339
	3248	Cambarus	polychromatus	5	RFT06075	7/7/06	WAYNE	WAYNE	DOUBLE CULVERT JUST SOUTH OF U.S. 27 ON UNION PIKE, 3.94 MI S OF FOUNTAIN CITY	39.8991	-84.9070
	3250	Cambarus	polychromatus	5	RFT06076	7/7/06	WAYNE	WAYNE	U.S. 40, 1.59 MI W OF RICHMOND	39.8239	-84.9191
1560	1544	Cambarus	polychromatus	1	RFT2005007	6/13/05	DELAWARE	PERRY	S C.R. 750 E, 2.0 MI SE OF SMITHFIELD	40.1487	-85.2444
	1547	Cambarus	polychromatus	26	RFT2005008	6/13/05	DELAWARE	HARRISON	N C.R. 950 W, 0.67 MI SE OF GILMAN	40.2294	-85.5662
1564	1549	Cambarus	polychromatus	5	RFT2005009	6/13/05	DELAWARE	HAMILTON	N AUSTIN DRIVE, 3.75 MI NW OF MUNCIE	40.2409	-85.4307
		Cambarus	polychromatus	4	RFT2005013	6/14/05	RANDOLPH	WHITE RIVER	S HUNTSVILLE ROAD, 3.125 MI S OF WINCHESTER	40.1312	-85.0053
		Cambarus	polychromatus	3	RFT2005014	6/14/05	RANDOLPH	WHITE RIVER	BASE ROAD, 2.13 MI N OF RURAL	40.1346	-84.9768
1580	1568	Cambarus	polychromatus	1	RFT2005015	6/15/05	DELAWARE	CENTER	S HOYT AVENUE, 1.5 MI S OF MUNCIE	40.1712	-85.4068
	1574	Cambarus	polychromatus	1	RFT2005017	6/15/05	RANDOLPH	UNION	C.R. 700 S, 2.55 MI NW OF LYNN	40.0620	-85.1196
	1576	Cambarus	polychromatus	9	RFT2005018	6/16/05	DELAWARE	WAYNE	C.R. 625 E, 1.7 MI SE OF HARRISVILLE	40.1681	-85.8580
		Cambarus	polychromatus	6	RFT2005019	6/16/05	DELAWARE	GREENS FORK	S ARBA PIKE, 1.58 MI S OF BURTONIA	40.0925	-84.8515
	1583	Cambarus	polychromatus	11	RFT2005020	6/16/05	RANDOLPH	JACKSON	C.R. 800 N, 2.24 MI SE OF NEW PITTSBURG	40.2803	-84.8735
	1586	Cambarus	polychromatus	7	RFT2005021	6/16/05	JAY	MADISON	C.R. 150 S, 2.88 MI NE OF BONDARY CITY	40.3678	-84.8763
	1589	Cambarus	polychromatus	6	RFT2005022	6/17/05	JAY	PIKE	C.R. 134 S, 1.48 MI SW OF GREENE	40.3880	-85.1096
	1591	Cambarus	polychromatus	2	RFT2005023	6/17/05	JAY	PIKE	C.R. 140 S, 2.19 MI NW OF ANTIOCH	40.3819	-84.9510

Table A-7. Locality records for *Cambarus polychromatus* cont.											
OSU	**INBSC**	**Genus**	**Species**	**Total**	**Field No**	**Date**	**County**	**Township**	**Locality**	**Lat**	**Long**
~~1599~~	1593	Cambarus	polychromatus	50	RFT2005024	6/29/05	JAY	NOBLE	C.R. 200 S, 1.02 MI SE OF BRICE	40.4116	-84.8789
~~1603~~	1597	Cambarus	polychromatus	1	RFT2005026	6/29/05	JAY	JACKSON	C.R. 87 E, 2.24 MI NW OF POLING	40.5589	-85.0777
1610		Cambarus	polychromatus	3	RFT2005027	6/30/05	BLACKFORD	JACKSON	DIVISION ROAD (C.R. 100 S), 1.37 MI W OF RIDERTOWN	40.4358	-85.2327
1613		Cambarus	polychromatus	2	RFT2005028	6/30/05	BLACKFORD	WASHINGTON	C.R. 300 N, 3.28 MI NE OF HARTFORD CITY	40.4932	-85.3392
1617		Cambarus	polychromatus	35	RFT2005030	6/30/05	BLACKFORD	LICKING	MAHEE ROAD, 3.87 MI NW OF EATON	40.3825	-85.4121
		Cambarus	polychromatus	2	RFT2005031	7/1/05	BLACKFORD	WASHINGTON	C.R. 600 N, 1.05 MI SW OF ROLL	40.5381	-85.3972
1623		Cambarus	polychromatus	5	RFT2005032	7/1/05	BLACKFORD	WASHINGTON	C.R. 600 N, 2.48 MI SE OF ROLL	40.5377	-85.3472
~~1627~~	1620	Cambarus	polychromatus	4	RFT2005033	7/4/05	JAY	GREEN	S.R. 26, 1.28 MI E OF PONY	40.4451	-85.0704
~~1630~~		Cambarus	polychromatus	3	RFT2005034	7/4/05	BLACKFORD	HARRISON	S.R. 18, EDGE OF MONTPELIER	40.5536	-85.2719
~~1634~~		Cambarus	polychromatus	11	RFT2005035	7/5/05	GRANT	JEFFERSON	C.R. 600 E, 1.26 MI SE OF FOWLERTON	40.3940	-85.5594
		Cambarus	polychromatus	3	RFT2005036	7/5/05	GRANT	JEFFERSON	S.R. 22, 4.97 MI E OF GAS CITY	40.4804	-85.5188
~~1639~~		Cambarus	polychromatus	1	RFT2005037	7/5/05	GRANT	JEFFERSON	S WHEELING PIKE, 1.59 MI NW OF MATTHEWS	40.4070	-85.5181
~~1642~~	1637	Cambarus	polychromatus	1	RFT2005038	7/5/05	GRANT	LIBERTY	C.R. 100 W, 2.47 MI NW OF FAIRMONT	40.4639	-85.6914
		Cambarus	polychromatus	5	RFT2005039	7/6/05	GRANT	VAN BUREN	C.R. 100 N, 1.14 MI SE OF FARRVILLE	40.5670	-85.4568
		Cambarus	polychromatus	1	RFT2005040	7/6/05	GRANT	WASHINGTON	C.R. 650 N, 6.62 MI NE OF MARION	40.6171	-85.6121
	1645	Cambarus	polychromatus	2	RFT2005041	7/6/05	GRANT	FRANKLIN	C.R. 400 W, 1.24 MI SW OF ROSEBURG	40.5123	-85.7485
	1650	Cambarus	polychromatus	2	RFT2005042	7/6/05	HOWARD	UNION	S C.R. 1050 E, 2.61 MI NW OF WEST LIBERTY	40.4529	-85.9315
	1652	Cambarus	polychromatus	2	RFT2005043	7/7/05	HOWARD	HOWARD	C.R. 300 N, 2.51 MI N OF VERMONT	40.5210	-86.0273
	1656	Cambarus	polychromatus	6	RFT2005044	7/7/05	HOWARD	HOWARD	C.R. 400 N, 5.24 MI NE OF KOKOMO	40.5355	-86.0575
	1661	Cambarus	polychromatus	3	RFT2005045	7/7/05	HOWARD	TAYLOR	C.R. 400 S, 2.85 MI NE OF SHARPSVILLE	40.4086	-86.0510
	1664	Cambarus	polychromatus	31	RFT2005046	7/7/05	HOWARD	TAYLOR	C.R. 250 E, 2.00 MI W OF HEMLOCK	40.4215	-86.0789
	1671	Cambarus	polychromatus	4	RFT2005048	7/26/05	MADISON	UNION	U.S. 236, 3.09 MI W OF MIDDLETOWN	40.0641	-85.5941
	1675	Cambarus	polychromatus	8	RFT2005049	7/26/05	MADISON	GREEN	S.R. 13, 2.13 MI NW OF INGELLS	39.9661	-85.8430
	1677	Cambarus	polychromatus	7	RFT2005050	7/26/05	MADISON	JACKSON	C.R. 500 W & W 8TH STREET, 2.25 MI NW OF EGEWOOD	40.1211	-85.7672
~~1685~~	1680	Cambarus	polychromatus	1	RFT2005051	7/27/05	MADISON	UNION	C.R. 200 S, 3.92 MI NW OF MIDDLETOWN	40.0777	-85.6068
	1682	Cambarus	polychromatus	1	RFT2005052	7/27/05	MADISON	MONROE	C.R. 425 E, 2.20 MI NE OF MOONVILLE	40.2247	-85.5901
		Cambarus	polychromatus	8	RFT2005053	7/27/05	MADISON	DUCK CREEK	C.R. 1200 N, 2.09 MI NE OF ELWOOD	40.2902	-85.7972
	1689	Cambarus	polychromatus	4	RFT2005054	7/27/05	TIPTON	WILDCAT	C.R. 400 N, 3.45 MI E OF WINDFALL	40.3637	-85.8904
	1692	Cambarus	polychromatus	4	RFT2005055	7/28/05	HOWARD	MONROE	C.R. 300 S, 2.66 MI NE OF RUSSIAVILLE	40.4316	-86.3188
~~1703~~	1696	Cambarus	polychromatus	4	RFT2005056	7/28/05	HOWARD	CENTER	W BOULEVARD ROAD, 1.54 MI N OF ALTO	40.4614	-86.1695
	1699	Cambarus	polychromatus	4	RFT2005057	7/28/05	TIPTON	PRAIRIE	C.R. 600 N, 8.33 MI SW OF KOKOMO	40.3884	-86.2266
~~1708~~		Cambarus	polychromatus	3	RFT2005060	7/28/05	TIPTON	JEFFERSON	C.R. 975 W, 3.53 MI SE OF KEMPTON	40.2429	-86.1985
	1705	Cambarus	polychromatus	4	RFT2005061	7/29/05	TIPTON	MADISON	C.R. 200 S, 2.47 MI W OF ELWOOD	40.2770	-85.8886
		Cambarus	polychromatus	6	RFT2005062	8/1/05	HENDRICKS	LIBERTY	C.R. 900 S, 4.15 MI E OF STILESVILLE	39.6301	-86.5556

Table A-7. Locality records for *Cambarus polychromatus* cont.

OSU	INBSC	Genus	Species	Total	Field No	Date	County	Township	Locality	Lat	Long
~~1715~~	1710	Cambarus	polychromatus	1	RFT2005063	8/1/05	HENDRICKS	LIBERTY	C.R. 1200 N, 1.5 MI N OF MONROVIA	39.6008	-86.4760
	1712	Cambarus	polychromatus	7	RFT2005064	8/2/05	BOONE	CLINTON	C.R. 50 E, 5.46 MI N OF LEBANON	40.1264	-86.4603
		Cambarus	polychromatus	7	RFT2005065	8/2/05	BOONE	WASHINGTON	C.R. 650 N, 7.77 MI NW OF LEBANON	40.1340	-86.5626
	1717	Cambarus	polychromatus	8	RFT2005066	8/2/05	BOONE	MARION	C.R. 500 N, 2.59 MI W OF SHERIDAN	40.1139	-86.2609
	1721	Cambarus	polychromatus	1	RFT2005067	8/2/05	BOONE	MARION	C.R. 750 E, 6.58 MI SW OF SHERIDAN	40.0850	-86.3274
	1723	Cambarus	polychromatus	9	RFT2005068	8/2/05	BOONE	WORTH	C.R. 800 E, 1.49 MI E OF WHITESTOWN	39.9974	-86.3192
~~1735~~	1725	Cambarus	polychromatus	2	RFT2005069	8/3/05	BOONE	CENTER	S BUDD ROAD, 5.38 MI E OF ADVANCE	40.0001	-86.5180
	1728	Cambarus	polychromatus	3	RFT2005070	8/3/05	BOONE	JACKSON	C.R. 300 S, 1.68 MI E OF ADVANCE	39.9957	-86.5883
1737	1732	Cambarus	polychromatus	3	RFT2005072	8/3/05	HENDRICKS	LINCOLN	C.R. 850 N, 2.20 MI S OF BROWNSBURG	39.9016	-86.3832
		Cambarus	polychromatus	4	RFT2005073	8/3/05	HENDRICKS	WASHINGTON	C.R. 100 N, 5.88 MI NE OF PLAINFIELD	39.7773	-86.3436
		Cambarus	polychromatus	2	RFT2005074	8/4/05	HENDRICKS	WASHINGTON	U.S. 36, 4.14 MI E OF DANVILLE	39.7632	-86.4180
~~1748~~	1740	Cambarus	polychromatus	6	RFT2005075	8/4/05	HENDRICKS	GUILFORD	C.R. 450 S (STAFFORD ROAD), 3.03 MI E OF PLAINFIELD	39.6975	-86.3425
	1742	Cambarus	polychromatus	11	RFT2005076	8/4/05	PUTNAM	WARREN	FAR END OF TRAILER PARK, 3.8 MI SE OF GREENCASTLE	39.5950	-86.8112
	1745	Cambarus	polychromatus	3	RFT2005077	8/4/05	PUTNAM	MADISON	C.R. 275 S, 3.8 MI SW OF GREENCASTLE	39.6213	-86.9234
1758		Cambarus	polychromatus	2	RFT2005078	8/4/05	PUTNAM	WASHINGTON	C.R. 550 S BRIDGE, 5.0 MI SW OF GREENCASTLE	39.5877	-86.9391
1764	1751	Cambarus	polychromatus	8	RFT2005079	8/8/05	FULTON	ROCHESTER	MERIDIAN LINE ROAD, 2.5 MI SW OF ROCHESTER	41.0352	-86.2421
1774		Cambarus	polychromatus	1	RFT2005083	8/9/05	PULASKI	INDIAN CREEK	C.R. 325 W, 2.56 MI S OF PULASKI	40.9391	-86.6686
		Cambarus	polychromatus	6	RFT2005085	8/9/05	PULASKI	MONROE	C.R. 300 S, 3.75 MI SW OF WINAMAC	41.0117	-86.6581
		Cambarus	polychromatus	16	RFT2005093	8/11/05	STARKE	NORTH BEND	S.R. 10, 3.61 MI W OF CULVER	41.2292	-86.4912
	1776	Cambarus	polychromatus	2	RFT2005094	8/11/05	FULTON	ROCHESTER	C.R. 100 W, 2.5 MI W OF ROCHESTER	41.0735	-86.2611
	1778	Cambarus	polychromatus	6	RFT2005095	8/12/05	FULTON	UNION	C.R. 350 S, 1.15 MI SW OF KEWANNA	41.0042	-86.4238
	1780	Cambarus	polychromatus	2	RFT2005096	8/12/05	FULTON	WAYNE	C.R. 725 S, 5.0 MI S OF KEWANNA	40.9495	-86.4204
	1781	Cambarus	polychromatus	2	RFT2005097	8/12/05	FULTON	WAYNE	C.R. 600 W, 1.36 MI SW OF MARSHTOWN	40.9343	-86.3562
	1783	Cambarus	polychromatus	2	RFT2005098	8/22/05	PUTNAM	MONROE	U.S. 36, JUST EAST OF U.S. 231, 3.71 MI W OF BAINBRIDGE	39.7628	-86.8814
~~1792~~	1784	Cambarus	polychromatus	4	RFT2005099	8/22/05	PUTNAM	FLOYD	E C.R. 800 N, 1.67 MI NE OF BAINBRIDGE	39.7749	-86.7842
	1787	Cambarus	polychromatus	7	RFT2005100	8/23/05	PUTNAM	FLOYD	C.R. 375 E, 3.48 MINW OF FILLMORE	39.7113	-86.7838
	1790	Cambarus	polychromatus	6	RFT2005101	8/23/05	PUTNAM	FLOYD	C.R. 500 N, 3.12 MI SE OF BAINBRIDGE	39.7320	-86.7677
		Cambarus	polychromatus	1	RFT2005102	8/23/05	CARROLL	WASHINGTON	C.R. 500 E, 2.40 MI NW OF DEER CREEK	40.6304	-86.4297
	1796	Cambarus	polychromatus	6	RFT2005104	8/24/05	FULTON	HENRY	C.R. 225 S, 1.06 MI S OF AKRON	41.0226	-86.0323
	1797	Cambarus	polychromatus	4	RFT2005105	8/24/05	FULTON	ROCHESTER	S.R. 14, 9.00 MI NW OF AKRON	41.0616	-86.1970
	1799	Cambarus	polychromatus	8	RFT2005107	8/24/05	MARSHALL	UNION	18TH ROAD, 7.16 MI NE OF MONTEREY	41.2156	-86.3722

Table A-7. Locality records for *Cambarus polychromatus* cont.											
OSU	**INBSC**	**Genus**	**Species**	**Total**	**Field No**	**Date**	**County**	**Township**	**Locality**	**Lat**	**Long**
	1800	Cambarus	polychromatus	7	RFT2005109	8/25/05	MARSHALL	BOURBON	E 8A ROAD, 4.51 MI NW OF BOURBON	41.3578	-86.1382
	1805	Cambarus	polychromatus	5	RFT2005110	8/25/05	MARSHALL	UNION	S.R. 17, 8.98 MI SW OF PLYMOUTH	41.2728	-86.4537
	1811	Cambarus	polychromatus	6	RFT2005111	8/26/05	MARSHALL	CENTER	8A ROAD, 3.92 MI NE OF PLYMOUTH	41.3589	-86.2373
	556	Cambarus	polychromatus	3	TPS04007	6/23/04	SWITZERLAND	PLEASANT	S.R. 250 BRIDGE, 1.25 MI SW AARON	38.8719	-85.1353
	558	Cambarus	polychromatus	1	TPS04010	6/23/04	SWITZERLAND	PLEASANT	BEAR CREEK RD. BRIDGE, 5.0 MI FRIENDSHIP	38.9111	-85.1592
	564	Cambarus	polychromatus	1	TPS04013	3/23/04	HARRISON	HARRISON	NEW MIDDLETOWN RD., CORYDON	38.2000	-86.2783
	581	Cambarus	polychromatus	1	TPS04024	3/25/04	MONTGOMERY	FRANKLIN	C.R. 625 E BRIDGE, 6.25 MI E CRAWFORDSVILLE	40.0475	-86.7892
	583	Cambarus	polychromatus	1	TPS04025	3/25/04	MONTGOMERY	WALNUT	C.R. 625 E BRIDGE, 3.25 MI N LADOGG	39.9565	-86.7853
	447	Cambarus	polychromatus	6	TPS04040	5/18/04	MONROE	PERRY	WALK BRIDGE, 2.4 MI SW BLOOMINGTON	39.1285	-86.5137
	450	Cambarus	polychromatus	3	TPS04041	5/19/04	MONROE	PERRY	HENDERSON RD. BRIDGE, SW BLOOMINGTON	39.1550	-86.5268
	453	Cambarus	polychromatus	5	TPS04048	6/22/04	DUBOIS	PATOKA	FERDINAND RD. BRIDGE, 2.5 MI SE HUNTINGBURG	38.1041	-86.9254
	460	Cambarus	polychromatus	1	TPS04059	7/20/04	LAWRENCE	PERRY	BEDFORD ST., 2.0 MI W REDHILL	38.9525	-86.5575
	464	Cambarus	polychromatus	4	TPS04060	7/20/04	LAWRENCE	SHAWSWICK	STARS BLVD., 1.25 MI SW SHAWSWICK	38.8767	-86.4419
	467	Cambarus	polychromatus	1	TPS04061	7/21/04	LAWRENCE	BONO	STONINGTON RD., 1.25 MI SW BONO	38.7317	-86.3758
	471	Cambarus	polychromatus	2	TPS04063	7/21/04	LAWRENCE	PLEASANT RUN	POWERLINE RD., 2.5 MI SE ZELMA	38.7311	-86.3761
	476	Cambarus	polychromatus	2	TPS04065	7/27/04	BENTON	YORK	C.R. 1000 W, 0.5 MI W RAUB	38.9753	-86.4431
	481	Cambarus	polychromatus	11	TPS04067	7/27/04	BENTON	CENTER	C.R. 300 S, 3.75 MI NE BOSWELL	40.5639	-87.3472
	483	Cambarus	polychromatus	5	TPS04068	7/28/04	BENTON	CENTER	C.R. 200 N, 4.0 MI SE LOCHIEL	40.5639	-87.3639
	485	Cambarus	polychromatus	11	TPS04069	7/28/04	BENTON	CENTER	C.R. 500 E, 3.5 MI SE BARCE	40.6000	-87.2000
	489	Cambarus	polychromatus	17	TPS04071	7/28/04	BENTON	GRANT	C.R. 875 S, 3.25 MI S CHASE	40.5378	-87.3397
	491	Cambarus	polychromatus	2	TPS04072	7/29/04	KNOX	HARRISON	C.R. SE 400 E (MT. ZION RD.), 2.5 MI NW MONROE CITY	38.6167	-87.3917
	494	Cambarus	polychromatus	11	TPS04073	7/29/04	KNOX	WASHINGTON	M. WAMPLER RD. / VASH RD., 2.5 MI SW RAGSDALE	38.7354	-87.3750
	497	Cambarus	polychromatus	4	TPS04074	7/29/04	KNOX	VIGO	C.R. 1025 N, 2.5 MI SW SANDBORN	38.8790	-87.2350
	1019	Cambarus	polychromatus	7	TPS04075	8/4/04	SULLIVAN	HADDON	C.R. 400 E BRIDGE, 5.0 MI NW BUCKTOWN	39.0033	-87.3339
	1020	Cambarus	polychromatus	6	TPS04076	8/4/04	SULLIVAN	GILL	C.R. 150 W, 3.75 MI NE PAXTON	39.0264	-87.4383
	504	Cambarus	polychromatus	6	TPS04079	8/4/04	SULLIVAN	FAIRBANKS	C.R. 975 N, 3.25 MI E FAIRBANKS	39.2269	-87.6458
	506	Cambarus	polychromatus	6	TPS04080	8/4/04	SULLIVAN	JACKSON	C.R. 550 E BRIDGE, 5.0 MI NE BALDRIDGE	39.2367	-87.3097
	524	Cambarus	polychromatus	7	TPS04088	8/10/04	DAVIESS	REEVE	C.R. 900 S, 1.2 MI N PORTERSVILLE	39.0708	-86.5197
	525	Cambarus	polychromatus	7	TPS04089	8/10/04	MARTIN	PERRY	C.R. 21 BRIDGE, 3.0 MI N LOOGOOTEE	38.6033	-86.8956
	528	Cambarus	polychromatus	7	TPS04090	8/10/04	DAVIESS	BARR	C.R. 700 E, 1.0 MI S MONTGOMERY	38.6383	-87.0358
	531	Cambarus	polychromatus	2	TPS04091	8/10/04	DAVIESS	VEALE	C.R. 50 W, 1.0 MI NW CUMBACK	38.5708	-87.2006
	532	Cambarus	polychromatus	11	TPS04092	8/10/04	DAVIESS	STEELE	C.R. 800 N, 5.0 MI SW PLAINVILLE	38.7789	-87.1728
	536	Cambarus	polychromatus	1	TPS04095	8/11/04	GREENE	RICHLAND	0.5 MI E INTERSECTION OF C.R. 150 E AND C.R. 175 S, 1.5 MI SE BLOOMFIELD	38.8828	-86.9597

Table A-7. Locality records for *Cambarus polychromatus* cont.											
OSU	**INBSC**	**Genus**	**Species**	**Total**	**Field No**	**Date**	**County**	**Township**	**Locality**	**Lat**	**Long**
	538	Cambarus	polychromatus	10	TPS04096	8/11/04	GREENE	STOCKTON	C.R. 1000 W, 3.0 MI NE LINTON	38.9942	-86.9131
	542	Cambarus	polychromatus	5	TPS04097	8/11/04	GREENE	JEFFERSON	C.R. 475 W, 2.5 MI W JOHNSTOWN	39.1619	-87.0358
	544	Cambarus	polychromatus	4	TPS04098	8/10/04	DAVIESS	WASHINGTON	C.R. 300 E BRIDGE, 3.0 MI S CORNETTSVILLE	38.5708	-87.1672
	608	Cambarus	polychromatus	2	TPS04105	9/4/04	GREENE	CASS	C.R. 225 W BRIDGE, 1.75 MI SE NEWBERRY	38.9033	-86.9969
	611	Cambarus	polychromatus	2	TPS04106	9/4/04	GREENE	TAYLOR	S.R. 231 BRIDGE, 1.75 MI N SCOTLAND	38.9458	-86.9269
1443	614	Cambarus	polychromatus	1	TPS04107	9/4/04	GREENE	JACKSON	C.R. 975 E BRIDGE, 4.0 MI N OWENSBURG	38.9806	-86.7597
	1964	Cambarus	polychromatus	3	TPS05007A	3/29/05	MONROE	PERRY	AT PARK AT DEAD END OF ELLISTON DRIVE, 2.0 MI SE BLOOMINGTON	39.1297	-86.5133
		Cambarus	polychromatus	3	TPS05010	4/9/05	BROWN	WASHINGTON	CROOKED CREEK ROAD BRIDGE, 2.8 MI E OF BELMONT	39.1550	-86.3053
	1446	Cambarus	polychromatus	2	TPS05011	4/9/05	BROWN	VAN BUREN	ELKINSVILLE ROAD BRIDGE, 2.0 MI SW OF STORY	39.0914	-86.2286
	1448	Cambarus	polychromatus	1	TPS05012	4/9/05	BROWN	VAN BUREN	BRAND HOLLOW BRIDGE, 1.5 MI E OF STONE HEAD	39.1308	-86.0964
1459	1454	Cambarus	polychromatus	4	TPS05015	6/2/05	SCOTT	FINLEY	LIBERTY KNOB BRIDGE, 2.2 MI NE OF BUNKER HILL	38.5984	-85.8550
1466	1457	Cambarus	polychromatus	4	TPS05016	4/19/05	BROWN	JACKSON	NORTH LICK CREEK ROAD BRIDGE, 0.2 MI N OF HELMSBURG	39.2678	-86.2975
		Cambarus	polychromatus	2	TPS05017	4/19/05	BROWN	JACKSON	HURDLE ROAD BRIDGE, 2.0 MI SE OF FRUITDALE	39.3111	-86.2386
1468	1462	Cambarus	polychromatus	3	TPS05019	4/19/05	BROWN	VAN BUREN	GARRITY ROAD BRIDGE, 1.0 MI E BECK'S GROVE	39.0758	-86.1031
1472		Cambarus	polychromatus	1	TPS05021	5/7/05	BARTHOLOMEW	FLAT ROCK	C.R. 300 N BRIDGE, 4.2 MI N OF COLUMBUS	39.2453	-85.8811
1479		Cambarus	polychromatus	1	TPS05022	5/7/05	BARTHOLOMEW	CLAY	C.R. 500 E BRIDGE, 0.125 MI S OF PETERSVILLE	39.2167	-85.8197
1482		Cambarus	polychromatus	3	TPS05023	5/7/05	BARTHOLOMEW	ROCK CREEK	C.R. 650 E BRIDGE, 4.0 MI SE OF COLUMBUS	39.1850	-85.7911
		Cambarus	polychromatus	1	TPS05025	5/7/05	BARTHOLOMEW	WAYNE	C.R. 600 S BRIDGE, 2.0 MI W OF JONESVILLE	39.1119	-85.9758
		Cambarus	polychromatus	1	TPS05026	5/7/05	BARTHOLOMEW	WAYNE	C.R. 950 S BRIDGE, 5.0 MI W OF JONESVILLE	39.0583	-85.9742
	1488	Cambarus	polychromatus	7	TPS05028	5/11/05	DUBOIS	HARRISON	C.R. 500 E BRIDGE, 2.2 MI N OF KELLERVILLE	38.5082	-86.8268
1514	1494	Cambarus	polychromatus	5	TPS05030	5/11/05	DUBOIS	BOONE	C.R. 600 N BRIDGE, 3.5 MI N OF IRELAND	38.4646	-87.0251
	1498	Cambarus	polychromatus	3	TPS05031	5/11/05	DUBOIS	HALL	C.R. 700 E BRIDGE, 2.75 MI N OF CELESTINE	38.4222	-86.7652
	1508	Cambarus	polychromatus	1	TPS05035	5/12/05	SPENCER	LUCE	C.R. 900 W BRIDGE, 0.1 MI W OF HATFIELD	37.8832	-87.2151
		Cambarus	polychromatus	1	TPS05037	5/12/05	SPENCER	GRASS	C.R. 600 N BRIDGE, 1.0 MI N OF RICHIE	37.9741	-87.0398
	1517	Cambarus	polychromatus	1	TPS05038	5/12/05	SPENCER	HAMMOND	S.R. 70 / 24 S BRIDGE, 0.75 MI E OF NEWTONVILLE	38.0009	-86.9298
	1520	Cambarus	polychromatus	2	TPS05039	5/12/05	SPENCER	CLAY	C.R. 200 E BRIDGE, 5.5 MI W OF LAMAR	38.0817	-87.0129
	1526	Cambarus	polychromatus	3	TPS05041	5/12/05	SPENCER	HARRISON	C.R. 1400 N BRIDGE, 3.75 MI SE OF SANTA CLAUS	38.0893	-86.8351
	1529	Cambarus	polychromatus	1	TPS05042	5/12/05	SPENCER	HARRISON	C.R. 1100 E BRIDGE, 2.0 MI NW OF ST MEINRAD	38.1920	-86.8447
	1533	Cambarus	polychromatus	1	TPS05043	5/13/05	PERRY	ANDERSON	C.R. 88 BRIDGE, 4.0 MI W OF GERALD	38.0151	-86.6602
	1542	Cambarus	polychromatus	1	TPS05049	5/13/05	PERRY	OIL	C.R. 41A BRIDGE, 1.3 MI SE OF ST CROIX	38.2158	-86.5775
	1848	Cambarus	polychromatus	2	TPS05058	5/17/05	RIPLEY	DELAWARE	C.R. 925 N, 3.75 MI E OF NAPOLEON	39.2072	-85.2589
	1852	Cambarus	polychromatus	3	TPS05059	5/17/05	RIPLEY	DELAWARE	N OLD MILAN ROAD, 3.7 MI NW OF PIERCEVILLE	39.1853	-85.1915

Table A-7. Locality records for *Cambarus polychromatus* cont.

OSU 3362	INBSC	Genus	Species	Total	Field No	Date	County	Township	Locality	Lat	Long
	1855	Cambarus	polychromatus	2	TPS05060	5/17/05	RIPLEY	WASHINGTON	C.R. 625 E, 5.0 MI E OF VERSAILLES	39.0653	-85.1442
1935		CAMBARUS	polychromatus	1	TPS05061	5/17/05	RIPLEY	BROWN	S.R. 62, 0.0.1 MI W OF FRIENDSHIP	38.9657	-85.1443
	1859	Cambarus	polychromatus	2	TPS05062	5/17/05	RIPLEY	BROWN	C.R. 925 S, 3.8 MI W OF CROSS PLAINS	38.9421	-85.2743
		Cambarus	polychromatus	3	TPS05065	5/18/05	DECATUR	WASHINGTON	C.R. 120 E, 3.65 MI NE OF GREENSBURG	39.3764	-85.4563
	1866	Cambarus	polychromatus	1	TPS05067	5/18/05	DECATUR	MARION	C.R. 400 S, 6.25 MI SW NEW POINT	39.2783	-85.4371
	1872	Cambarus	polychromatus	2	TPS05069	5/18/05	DECATUR	JACKSON	C.R. 1300 S, 1.25 MI SW OF SARDINA	39.1461	-85.6475
1885	1875	Cambarus	polychromatus	3	TPS05070	6/29/05	DECATUR	CLAY	C.R. 750 W, 3.25 MI S OF BURNEY	39.2739	-85.6268
1891	1882	Cambarus	polychromatus	4	TPS05074	5/19/05	FRANKLIN	BUTLER	PIPE CREEK ROAD (WHERE PIPE CREEK & CLEAR FORK MEET), 4.75 MI S OF METAMORA	39.3836	-85.1312
1894		Cambarus	polychromatus	1	TPS05075	5/19/05	FRANKLIN	BROOKVILLE	BLUE CREEK ROAD, 3.75 MI SW OF BROOKVILLE	39.3926	-85.0277
		Cambarus	polychromatus	2	TPS05077	5/19/05	FRANKLIN	WHITEWATER	JOHNSON FORK ROAD?, 0.01 MI S OF ROCKDALE	39.3078	-84.8450
1926		Cambarus	polychromatus	3	TPS05078	5/23/05	GIBSON	WASHINGTON	STEELMAN CHAPEL ROAD BRIDGE, 3.0 MI SW OF HAZELTON	38.4459	-87.5575
3369	1908	Cambarus	polychromatus	3	TPS05084	5/23/05	GIBSON	PATOKA	C.R. 450 S BRIDGE, 4.5 MI SE OF PRINCETON	38.2894	-87.5083
		Cambarus	polychromatus	1	TPS05085	5/24/05	POSEY	BETHEL	C.R. 300 E BRIDGE, 3.0 MI E OF GRIFFIN	38.2197	-87.8553
	2025	Cambarus	polychromatus	1	TPS05101	5/26/05	WARRICK	GREER	C.R. 68 BRIDGE, 4.0 MI W OF LYNNVILLE	38.1942	-87.3783
		Cambarus	polychromatus		TPS05107	5/26/05	VANDERBURGH	SCOTT	SCHLENSKER ROAD BRIDGE, 1.5 MI N OF EARL	38.1074	-87.5127
	3371	Cambarus	polychromatus	1	TPS05108	5/31/05	PIKE	CLAY	C.R. 950 W BRIDGE, 2.7 MI SE OF IONA	38.5137	-87.4461
3383	3375	Cambarus	polychromatus	1	TPS05109	5/31/05	PIKE	CLAY	C.R. 850 W BRIDGE, 0.75 MI N OF UNION	38.4760	-87.4351
	3378	Cambarus	polychromatus	3	TPS05110	5/31/05	PIKE	CLAY	C.R. 300 N BRIDGE, 3.75 MI SW OF PETERSBURG	38.4655	-87.3931
3386	3380	Cambarus	polychromatus	2	TPS05111	5/31/05	PIKE	MADISON	C.R. 325 W, 3.7 MI SW OF PETERSBURG	38.4669	-87.3388
		Cambarus	polychromatus	1	TPS05112	5/31/05	PIKE	WASHINGTON	C.R. 300 N BRIDGE, 1.25 MI NE OF WILLISVILLE	38.4656	-87.2818
3398		Cambarus	polychromatus	1	TPS05113	5/31/05	PIKE	WASHINGTON	C.R. 650 N BRIDGE, 3.2 MI NE OF PETERSBURG	38.5178	-87.2196
3420	3391	Cambarus	polychromatus	1	TPS05115	6/1/05	VIGO	PIERSON	LOUISVILLE ROAD BRIDGE, 2.4 MI NE OF BLACKHAWK	39.3247	-87.2606
3489		Cambarus	polychromatus	4	TPS05118	6/1/05	VIGO	SUGAR CREEK	SARAH MEYERS ROAD, 3.75 MI W OF WEST TERRE HAUTE	39.4700	-87.4847
		Cambarus	polychromatus	1	TPS05127	6/3/05	CLAY	VAN BUREN	C.R. 1200 N BRIDGE, 0.5 MI W OF CORDONIA	39.5617	-87.1168
3438	3424	Cambarus	polychromatus	1	TPS05129	6/3/05	CLAY	PERRY	C.R. 300 S, 2.5 MI SE OF CORY	39.3451	-87.1939
3441		Cambarus	polychromatus	4	TPS05138	6/7/05	JEFFERSON	REPUBLICAN	C.R. 1066 W BRIDGE, 1.3 MI W OF SWAINVILLE	38.6899	-85.5862
3446		Cambarus	polychromatus	1	TPS05147	6/8/05	CLARK	CARR	DEAM LAKE ROAD (AT RAILROAD BRIDGE), 4.3 MI SE OF NEW PROVIDENCE	38.4490	-85.8652
		Cambarus	polychromatus	1	TPS05148	6/8/05	FLOYD	NEW ALBANY	S.R. 311, 3.5 MI SE OF ST JOSEPH	38.3562	-85.7905
		Cambarus	polychromatus	4	TPS05151	6/8/05	FLOYD	GREENVILLE	S.R. 150 BRIDGE, 1.25 MI NW OF GALENA	38.3632	-85.9594
	3451	Cambarus	polychromatus	1	TPS05153	6/9/05	FLOYD	FRANKLIN	FIVE MILE LANE BRIDGE, 1.0 MI NE OF BUCHANAN	38.2151	-85.8937

Table A-7. Locality records for *Cambarus polychromatus* cont.

OSU	INBSC	Genus	Species	Total	Field No	Date	County	Township	Locality	Lat	Long
~~3473~~	3462	Cambarus	polychromatus	3	TPS05161	6/9/05	HARRISON	HARRISON	TURLEY ROAD, 2.5 MI NW OF NEW MIDDLETOWN	38.1997	-86.0642
3477	3466	Cambarus	polychromatus	1	TPS05163	6/27/05	JACKSON	SALT CREEK	C.R. 725 N BRIDGE, 2.0 MI NW OF KURTZ	38.9799	-86.2171
3483		Cambarus	polychromatus	1	TPS05166	6/27/05	JACKSON	GRASSY FORK	C.R. 525 S, 1.5 MI SE OF WEGAN	38.8048	-86.0012
3507		Cambarus	polychromatus	1	TPS05167	6/27/05	JACKSON	WAHINGTO N	S.R. 250, 0.75 MI W OF DUDLEYTOWN	38.8517	-85.9154
3515		Cambarus	polychromatus	2	TPS05170	6/28/05	WASHINGTO N	POLK	LOCKENOUR ROAD BRIDGE, 2.0 MI W OF DAISY HILL	38.5121	-85.9751
		Cambarus	polychromatus	3	TPS05172	6/28/05	WASHINGTO N	WASHINGT ON	S.R. 56 BRIDGE, 2.6 MI SW OF GEORGETOWN	38.6270	-86.0522
3521		Cambarus	polychromatus	3	TPS05175	6/28/05	WASHINGTO N	BROWN	CAVETOWN ROAD BRIDGE, 0.3 MI W OF MT CARMEL	38.7154	-86.2598
	3519	Cambarus	polychromatus	3	TPS05177	6/29/05	JENNINGS	COLUMBIA	C.R. 750 E, 1.3 MI S OF ZENAS	39.0980	-85.4705
~~3342~~		Cambarus	polychromatus	2	TPS05178	6/29/05	JENNINGS	SAND CREEK	C.R. 450 N BRIDGE, 3.75 MI NE OF NORTH VERNON	39.0515	-85.5851
	3330	Cambarus	polychromatus	2	TPS06001B	9/29/06	DEKALB	RICHLAND	C.R. 40, 2.0 MI NW OF AUBURN	41.3814	-85.0900
	3313	Cambarus	polychromatus	1	TPS06002A	9/29/06	STEUBEN	SCOTT	C.R. 275 N, 3.25 MI SE OF FREMONT	41.6836	-84.9028
3353		Cambarus	polychromatus	1	TPS06106	9/29/06	LAGRANGE	CLEARSPRI NG	BRIDGE, 4.5 MI W OF WOLCOTTVILLE	41.5398	-85.4586
	3346	Cambarus	polychromatus	5	TPS06108	9/29/06	NOBLE	YORK	C.R. 200 N BRIDGE, 5.0 MI W OF ALBION	41.3813	-85.4946
		Cambarus	polychromatus	1	TPS06110	9/29/06	NOBLE	WASHINGT ON	C.R. 900 W, 3.25 MI S OF CROMWELL	41.3493	-85.5955
	3356	Cambarus	polychromatus	1	TPS06111	9/29/06	NOBLE	GREEN	C.R. 500 S, 7.0 MI SE OF ALBION	41.2788	-85.3370
	3358	Cambarus	polychromatus	1	TPS06112	9/29/06	NOBLE	JEFFERSON	C.R. 400 E, 4.0 MI E OF ALBION	41.3825	-85.3476
	3359	Cambarus	polychromatus	2	TPS06113	9/29/06	NOBLE	ORANGE	C.R. 400 E, 5.0 MI W OF KENDALLVILLE	41.4233	-85.3468
	3253	Cambarus	polychromatus	3	TPS06150	8/26/06	JOHNSON	CLARK	C.R. 600 E, 1.0 MI SE OF ROCKLANE	39.6148	-85.9905
	3259	Cambarus	polychromatus	4	TPS06151	8/26/06	JOHNSON	CLARK	C.R. 500 N, 5.0 MI E OF WHITELAND	39.5513	-86.0184
~~3283~~	3264	Cambarus	polychromatus	4	TPS06153	8/26/06	JOHNSON	HENSLEY	C.R. 500 W, 3.0 MI S OF SAMARIA	39.3667	-86.1963
~~3530~~	3274	Cambarus	polychromatus	4	TPS06157	8/26/06	MORGAN	GREGG	S.R. 157 (S.R. 142?), 3.0 MI SE OF CROWN CENTER	39.5188	-86.5251
	3279	Cambarus	polychromatus	4	TPS06159	8/26/06	MORGAN	MONROE	C.R. 950 N, 2.0 MI SE OF MONROVIA	39.5641	-86.4537
3287		Cambarus	polychromatus	1	TPS06161	8/26/06	MORGAN	HARRISON	WAVERLY BOAT LAUNCH ROAD, 1.0 MI NW OF WAVERLY	39.5673	-86.2858
		Cambarus	polychromatus	4	TPS06162	8/26/06	JOHNSON	WHITE RIVER	C.R. 700 N, 2.0 MI W OF STONES CROSSING	39.5772	-86.1891
~~3302~~		Cambarus	polychromatus	4	TPS06163	8/26/06	JOHNSON	PLEASANT	C.R. 600 N, 0.5 MI NW OF NEW WHITELAND	39.5641	-86.1112
	3291	Cambarus	polychromatus	2	TPS06164	9/2/06	MARION	PIKE	PINE DRIVE, INDIANAPOLIS	39.9269	-86.1722
3304	3299	Cambarus	polychromatus	1	TPS06170	9/2/06	MARION	CENTER	VERMONT STREET, INDIANAPOLIS	39.7722	-86.1401
3309		Cambarus	polychromatus	3	TPS06172	9/2/06	HAMILTON	WASHINGT ON	COOL CREEK PARK, 3.0 MI S OF WESTFIELD	40.0129	-86.1263
		Cambarus	polychromatus	7	TPS06173	9/2/06	HAMILTON	NOBLESVILL E	RIVER AVENUE BRIDGE, 1.5 MI W OF NOBLESVILLE	40.0305	-86.0327
		Cambarus	polychromatus	5	TPS06177	9/2/06	HAMILTON	WHITE RIVER	281ST STREET, 1.0 MI W OF AROMA	40.1990	-85.9064

Table A-7. Locality records for *Cambarus polychromatus* cont.											
OSU	**INBSC**	**Genus**	**Species**	**Total**	**Field No**	**Date**	**County**	**Township**	**Locality**	**Lat**	**Long**
	1286	Cambarus	polychromatus	1	04IBC023	8/2/04	CLINTON	MICHIGAN	AT SR 29, 1.0 MI N OF MICHIGANTOWN	40.3366	-86.3930
	1008	Cambarus	polychromatus	1	04IBC031	8/2/04	CLINTON	OWEN	C.R. 0, 1.0 MI SSE OF MORAN	40.3679	-86.5058

Table A-8. Locality records for *Cambarus diogenes* recorded for the base study 2004-2007.

OSU	INBSC	GENUS	SUBGENUS	SPECIES	TOTAL	FieldNo	Date	County	Township	Locality 2	Lat	Long
	3152	Cambarus	Lacunicambarus	diogenes	6	RFT06040	6/9/06	ADAMS	MONROE	C.R. 400 S, 3.31 MI NE OF BERNE	40.680279	-84.896797
	1475	Cambarus	Lacunicambarus	diogenes	3	TPS05024	5/7/05	BARTHOLOMEW	ROCK CREEK	C.R. 900 E BRIDGE, 3.5 MI NE OF ELIZABETHTOWN	39.173889	-85.739998
	1478	Cambarus	Lacunicambarus	diogenes	2	TPS05025	5/7/05	BARTHOLOMEW	WAYNE	C.R. 600 S BRIDGE, 2.0 MI W OF JONESVILLE	39.111938	-85.975830
	1481	Cambarus	Lacunicambarus	diogenes	2	TPS05026	5/7/05	BARTHOLOMEW	WAYNE	C.R. 950 S BRIDGE, 5.0 MI W OF JONESVILLE	39.058331	-85.974167
	1607	Cambarus	Lacunicambarus	diogenes	8	RFT2005029	6/30/05	BLACKFORD	HARRISON	C.R. 400 E, 4.78 MI S OF MONTPELIER	40.486519	-85.296532
	1445	Cambarus	Lacunicambarus	diogenes	1	TPS05011	4/9/05	BROWN	VAN BUREN	ELKINSVILLE ROAD BRIDGE, 2.0 MI SW OF STORY	39.091389	-86.228607
	3437	Cambarus	Lacunicambarus	diogenes	4	TPS05147	6/8/05	CLARK	CARR	DEAM LAKE ROAD (AT RAILROAD BRIDGE), 4.3 MI SE OF NEW PROVIDENCE	38.449009	-85.865219
	3501	Cambarus	Lacunicambarus	diogenes	3	TPS05145	6/7/05	CLARK	CHARLESTOWN	STONY POINTE ROAD, 2.3 MI NE OF PERRY CROSSING	38.455101	-85.725372
	3504	Cambarus	Lacunicambarus	diogenes	5	TPS05146	6/8/05	CLARK	UNION	CHARLESTOWN-MEMPHIS ROAD BRIDGE, 2.8 MI N OF PERRY CROSSING	38.481331	-85.752922
	3498	Cambarus	Lacunicambarus	diogenes	1	TPS05144	6/7/05	CLARK	UTICA	SALEM-NOBLE ROAD, 1.0 MI NW OF PRATHER	38.389671	-85.708138
	3429	Cambarus	Lacunicambarus	diogenes	2	TPS05133	6/3/05	CLAY	WASHINGTON	C.R. 200 N BRIDGE, 2.4 MI N OF BOWLING GREEN	39.415020	-87.021393
	1406	Cambarus	Lacunicambarus	diogenes	2	04827	6/28/04	CLINTON	KIRKLIN	CR 900 E, FRANKFORT	40.258991	-86.338280
	530	Cambarus	Lacunicambarus	diogenes	6	TPS04091	8/10/04	DAVIESS	VEALE	C.R. 50 W, 1.0 MI NW CUMBACK	38.570835	-87.200554
	543	Cambarus	Lacunicambarus	diogenes	6	TPS04098	8/10/04	DAVIESS	WASHINGTON	C.R. 300 E BRIDGE, 3.0 MI S CORNETTSVILLE	38.570835	-87.167221
	1927	Cambarus	Lacunicambarus	diogenes	7	TPS05050	5/16/05	DEARBORN	JACKSON	BLUE CREEK ROAD, 1.75 MI NW OF LAWRENCEVILLE	39.304798	-85.052032
	1861	Cambarus	Lacunicambarus	diogenes	3	TPS05066	5/18/05	DECATUR	FUGIT	C.R. 400 E, 7.5 MI NE OF GREENSBURG	39.434471	-85.404343
	1871	Cambarus	Lacunicambarus	diogenes	2	TPS05069	5/18/05	DECATUR	JACKSON	C.R. 1300 S, 1.25 MI SW OF SARDINA	39.146061	-85.647499
	1865	Cambarus	Lacunicambarus	diogenes	2	TPS05067	5/18/05	DECATUR	MARION	C.R. 400 S, 6.25 MI SW NEW POINT	39.278259	-85.437073

Table A-8. Locality records for *Cambarus diogenes* cont.

OSU	INBSC	GENUS	SUBGENUS	SPECIES	TOTAL	FieldNo	Date	County	Township	Locality 2	Lat	Long
	1869	Cambarus	Lacunicambarus	diogenes	2	TPS05068	5/18/05	DECATUR	MARION	C.R. 1000 S, 3.25 MI NE OF WESTPORT	39.189720	-85.512779
	1934	Cambarus	Lacunicambarus	diogenes	1	TPS05065	5/18/05	DECATUR	WASHINGTON	C.R. 120 E, 3.65 MI NE OF GREENSBURG	39.376450	-85.456337
	3328	Cambarus	Lacunicambarus	diogenes	3	TPS06006B	9/29/06	DEKALB	CONCORD	C.R. 55, 3.0 MI N OF SPENCERVILLE	41.328789	-84.925972
	3325	Cambarus	Lacunicambarus	diogenes	4	TPS06005B	9/29/06	DEKALB	STAFFORD	C.R. 75, 4.0 MI SE OF BUTLER	41.383991	-84.831383
	1553	Cambarus	Lacunicambarus	diogenes	2	RFT2005011	6/14/05	DELAWARE	HAMILTON	N CENTRAL AVENUE, 1.5 MI NW OF ROVERTON	40.277931	-85.386436
	1557	Cambarus	Lacunicambarus	diogenes	8	RFT2005012	6/14/05	DELAWARE	LIBERTY	S.R. 32, 1.125 MI E OF HYDE PARK	40.193241	-85.287750
	1505	Cambarus	Lacunicambarus	diogenes	1	TPS05034	5/11/05	DUBOIS	CASS	C.R. 1150 S BRIDGE, 2.5 MI SE OF HOLLAND	38.203468	-87.008438
	1497	Cambarus	Lacunicambarus	diogenes	3	TPS05031	5/11/05	DUBOIS	HALL	C.R. 700 E BRIDGE, 2.75 MI N OF CELESTINE	38.422199	-86.765244
	1492	Cambarus	Lacunicambarus	diogenes	6	TPS05029	5/11/05	DUBOIS	HARRISON	C.R. 150 E BRIDGE, 1.5 MI NW OF KELLERSVILLE	38.495949	-86.864929
	1501	Cambarus	Lacunicambarus	diogenes	7	TPS05032	5/11/05	DUBOIS	JEFFERSON	C.R. 100 E BRIDGE, 2.25 MI N OF BIRDSEYE	38.345001	-86.694748
	1503	Cambarus	Lacunicambarus	diogenes	7	TPS05033	5/11/05	DUBOIS	JEFFERSON	C.R. 201 A BRIDGE, 4.75 MI S OF BIRDSEYE	38.248241	-86.711281
	3450	Cambarus	Lacunicambarus	diogenes	1	TPS05153	6/9/05	FLOYD	FRANKLIN	FIVE MILE LANE BRIDGE, 1.0 MI NE OF BUCHANAN	38.215061	-85.893723
	1878	Cambarus	Lacunicambarus	diogenes	2	TPS05072	6/29/05	FRANKLIN	SALT CREEK	STIPPS HILL ROAD, 4.25 MI S OF LAUREL	39.437260	-85.195221
	1775	Cambarus	Lacunicambarus	diogenes	2	RFT2005094	8/11/05	FULTON	ROCHESTER	C.R. 100 W, 2.5 MI W OF ROCHESTER	41.073471	-86.261093
	1896	Cambarus	Lacunicambarus	diogenes	2	TPS05079	5/23/05	GIBSON	MONTGOMERY	C.R. 50 S BRIDGE, 3.0 MI E OF SKELTON	38.355919	-87.715187
	1903	Cambarus	Lacunicambarus	diogenes	9	TPS05082	5/23/05	GIBSON	MONTGOMERY	S.R. 65 BRIDGE, 1.5 MI S OF OWENSVILLE	38.240688	-87.695328
	1907	Cambarus	Lacunicambarus	diogenes	4	TPS05084	5/23/05	GIBSON	PATOKA	C.R. 450 S BRIDGE, 4.5 MI SE OF PRINCETON	38.289360	-87.508339
	1905	Cambarus	Lacunicambarus	diogenes	6	TPS05083	5/23/05	GIBSON	UNION	C.R. 25 W BRIDGE, 1 MI S OF FORT BRANCH	38.229290	-87.577240
	1900	Cambarus	Lacunicambarus	diogenes	3	TPS05080	5/23/05	GIBSON	WABASH	C.R. 1675 W BRIDGE, 2.0 MI W OF HICKORY RIDGE	38.238110	-87.878487
	1924	Cambarus	Lacunicambarus	diogenes	8	TPS05081	5/23/05	GIBSON	WABASH	C.R. 1350 W BRIDGE, 3.0 MI NE OF GRIFFIN	38.241199	-87.817642
	1893	Cambarus	Lacunicambarus	diogenes	7	TPS05078	5/23/05	GIBSON	WASHINGTON	STEELMAN CHAPEL ROAD BRIDGE, 3.0 MI SW OF HAZELTON	38.445950	-87.557549

Table A-8. Locality records for *Cambarus diogenes* cont.												
OSU	INBSC	GENUS	SUBGENUS	SPECIES	TOTAL	FieldNo	Date	County	Township	Locality 2	Lat	Long
	541	Cambarus	Lacunicambarus	diogenes	4	TPS04097	8/11/04	GREENE	JEFFERSON	C.R. 475 W, 2.5 MI W JOHNSTOWN	39.161940	-87.035830
	3310	Cambarus	Lacunicambarus	diogenes	4	TPS06178	9/2/06	HAMILTON	CLAY	MOHAWK/126TH STREET BRIDGE, 1.0 MI E OF CARMEL	39.971169	-86.096619
	3306	Cambarus	Lacunicambarus	diogenes	2	TPS06174	9/2/06	HAMILTON	NOBLESVILLE	UNION CHAPEL BRIDGE, 2.0 MI E OF NOBLESVILLE	40.032890	-85.976021
	3303	Cambarus	Lacunicambarus	diogenes	3	TPS06172	9/2/06	HAMILTON	WASHINGTON	COOL CREEK PARK, 3.0 MI S OF WESTFIELD	40.012890	-86.126297
	3308	Cambarus	Lacunicambarus	diogenes	3	TPS06175	9/2/06	HAMILTON	WAYNE	186TH STREET, 1.0 MI W OF DURBIN	40.059021	-85.930107
6469		Cambarus	Lacunicambarus	diogenes	1	RFT07021	8/7/07	Hancock	Blue River	Sixmile Creek at bridge on Co. Rd. 300 S [SE of Greenfield, W of Carthage],	39.742210	-85.639640
6474		Cambarus	Lacunicambarus	diogenes	2	RFT07022	8/7/07	Hancock	Center	Little Brandywine Creek in pasture and upstream bridge on Co. Rd. 200 S [SE of Greenfield, SW of Riley],	39.758790	-85.745090
6480		Cambarus	Lacunicambarus	diogenes	2	RFT07025	8/7/07	Hancock	Center	unnamed ditch tributary to Little Brandywine Creek at bridge on US Rt 40 [E of Greenfield, NW of Westland],	39.787560	-85.714680
6477		Cambarus	Lacunicambarus	diogenes	3	RFT07023	8/7/07	Hancock	Green	Baretts Ditch at bridge on IN Rt. 234 [E of Eden, N of Arrowhead],	39.901170	-85.765880
	1730	Cambarus	Lacunicambarus	diogenes	7	RFT2005071	8/3/05	HENDRICKS	BROWN	C.R. 800 E, 5.14 MI NE OF PITTSBORO	39.901539	-86.383110
	3212	Cambarus	Lacunicambarus	diogenes	2	RFT06064	7/5/06	HENRY	LIBERTY	EAST BROWN ROAD, 3.09 MI SE OF HILLSBORO	39.946800	-85.279747
	3228	Cambarus	Lacunicambarus	diogenes	4	RFT06070	7/6/06	HENRY	SPICELAND	U.S. 40, 1.23 MI NE OF KNIGHTSTOWN	39.802711	-85.504150
	1649	Cambarus	Lacunicambarus	diogenes	5	RFT2005042	7/6/05	HOWARD	UNION	S C.R. 1050 E, 2.61 MI NW OF WEST LIBERTY	40.452881	-85.931511
	3130	Cambarus	Lacunicambarus	diogenes	6	RFT06031	6/7/06	HUNTINGTON	SALAMONIE	S.R. 218, 2.77 MI SE OF WARREN	40.654018	-85.390266
	3472	Cambarus	Lacunicambarus	diogenes	1	TPS05166	6/27/05	JACKSON	GRASSY FORK	C.R. 525 S, 1.5 MI SE OF WEGAN	38.804798	-86.001152
	3468	Cambarus	Lacunicambarus	diogenes	2	TPS05164	6/27/05	JACKSON	HAMILTON	C.R. 400 N BRIDGE, 1.5 MI N OF MILPORT	38.935390	-86.040642

Table A-8. Locality records for *Cambarus diogenes* cont.												
OSU	**INBSC**	**GENUS**	**SUBGENUS**	**SPECIES**	**TOTAL**	**FieldNo**	**Date**	**County**	**Township**	**Locality 2**	**Lat**	**Long**
	3479	Cambarus	Lacunicambarus	diogenes	4	TPS05168	6/27/05	JACKSON	REDDING	C.R. 700 N BRIDGE, 1.0 MI NW OF CONOLOGUE	38.984230	-85.814072
	3465	Cambarus	Lacunicambarus	diogenes	4	TPS05163	6/27/05	JACKSON	SALT CREEK	C.R. 725 N BRIDGE, 2.0 MI NW OF KURTZ	38.979889	-86.217079
	3476	Cambarus	Lacunicambarus	diogenes	3	TPS05167	6/27/05	JACKSON	WAHINGTON	S.R. 250, 0.75 MI W OF DUDLEYTOWN	38.851669	-85.915398
	701	Cambarus	Lacunicambarus	diogenes	3	RFT04031	6/30/04	JASPER	BARKLEY	DIVISION RD., NE MOODY	41.012711	-87.007057
	679	Cambarus	Lacunicambarus	diogenes	1	RFT04021	6/28/04	JASPER	CARPENTER	C.R. 1800 S, 2.0 MI ESE GOODLAND	40.751240	-87.254242
	3523	Cambarus	Lacunicambarus	diogenes	4	TPS05179	6/29/05	JENNINGS	CAMPBELL	C.R. 615 E, 1.75 MI SE OF BUTLERVILLE	39.008942	-85.500053
	3518	Cambarus	Lacunicambarus	diogenes	1	TPS05177	6/29/05	JENNINGS	COLUMBIA	C.R. 750 E, 1.3 MI S OF ZENAS	39.098000	-85.470520
	3527	Cambarus	Lacunicambarus	diogenes	1	TPS05181	7/5/05	JENNINGS	VERNON	C.R. 150 W BRIDGE, 2.65 MI SW OF VERNON	38.951389	-85.640457
	3260	Cambarus	Lacunicambarus	diogenes	4	TPS06152	8/26/06	JOHNSON	BLUE RIVER	MAUXFERRY ROAD, 2.0 MI W OF AMITY	39.428909	-86.037682
	3254	Cambarus	Lacunicambarus	diogenes	4	TPS06150	8/26/06	JOHNSON	CLARK	C.R. 600 E, 1.0 MI SE OF ROCKLANE	39.614792	-85.990509
	3258	Cambarus	Lacunicambarus	diogenes	9	TPS06151	8/26/06	JOHNSON	CLARK	C.R. 500 N, 5.0 MI E OF WHITELAND	39.551338	-86.018402
	3267	Cambarus	Lacunicambarus	diogenes	6	TPS06154	8/26/06	JOHNSON	UNION	W DIVISION ROAD, 6.0 MI SW OF BARGERSVILLE	39.479351	-86.230209
	490	Cambarus	Lacunicambarus	diogenes	5	TPS04072	7/29/04	KNOX	HARRISON	C.R. SE 400 E (MT. ZION RD.), 2.5 MI NW MONROE CITY	38.616665	-87.391670
	493	Cambarus	Lacunicambarus	diogenes	1	TPS04073	7/29/04	KNOX	WASHINGTON	M. WAMPLER RD. / VASH RD., 2.5 MI SW RAGSDALE	38.735401	-87.375000
	2223	Cambarus	Lacunicambarus	diogenes	1	JLB06031	6/7/06	KNOX	WIDNER	FREELANDVILLE RD, FREELANDVILLE	38.858231	-87.360367
	3343	Cambarus	Lacunicambarus	diogenes	2	TPS06106	9/29/06	LAGRANGE	CLEARSPRING	BRIDGE, 4.5 MI W OF WOLCOTTVILLE	41.539768	-85.458580
	649	Cambarus	Lacunicambarus	diogenes	4	RFT04011	6/16/04	LAKE	CEDAR CREEK	S.R. 55 BRIDGE, 3.75 MI N SHELBY	41.246811	-87.343651
	659	Cambarus	Lacunicambarus	diogenes	1	RFT04014	6/17/04	LAKE	NORTH	CALUMET AVE., MUNSTER	41.551941	-87.508789
	669	Cambarus	Lacunicambarus	diogenes	1	RFT04018	6/18/04	LAPORTE	LINCOLN	C.R. 75 S, ESE LAPORTE	41.593861	-86.542137
	660	Cambarus	Lacunicambarus	diogenes	5	RFT04015	6/17/04	LAPORTE	MICHIGAN	S.R. 212, W MICHIGAN CITY	41.707439	-86.825691
	663	Cambarus	Lacunicambarus	diogenes	1	RFT04016	6/17/04	LAPORTE	MICHIGAN	U.S. 12, S DUNELAND BEACH	41.741348	-86.843292

Table A-8. Locality records for *Cambarus diogenes* cont.												
OSU	**INBSC**	**GENUS**	**SUBGENUS**	**SPECIES**	**TOTAL**	**FieldNo**	**Date**	**County**	**Township**	**Locality 2**	**Lat**	**Long**
	665	Cambarus	Lacunicambarus	diogenes	4	RFT04017	6/17/04	LAPORTE	SPRINGFIELD	C.R. 925 N, NE MICHIGAN CITY	41.740601	-86.754570
	1670	Cambarus	Lacunicambarus	diogenes	5	RFT2005048	7/26/05	MADISON	UNION	U.S. 236, 3.09 MI W OF MIDDLETOWN	40.064121	-85.594147
	3292	Cambarus	Lacunicambarus	diogenes	3	TPS06164	9/2/06	MARION	PIKE	PINE DRIVE, INDIANAPOLIS	39.926941	-86.172218
	3293	Cambarus	Lacunicambarus	diogenes	1	TPS06165	9/2/06	MARION	PIKE	ALVERNIA STREET, INDIANAPOLIS	39.907372	-86.171806
	3294	Cambarus	Lacunicambarus	diogenes	7	TPS06166	9/2/06	MARION	WASHINGTON	N RIVER ROAD, INDIANAPOLIS	39.919640	-86.095299
	3296	Cambarus	Lacunicambarus	diogenes	1	TPS06167	9/2/06	MARION	WAYNE	42ND STREET, INDIANAPOLIS	39.830090	-86.205147
	1804	Cambarus	Lacunicambarus	diogenes	2	RFT2005110	8/25/05	MARSHALL	UNION	S.R. 17, 8.98 MI SW OF PLYMOUTH	41.272800	-86.453697
	1136	Cambarus	Lacunicambarus	diogenes	1	BC04117	7/19/04	MARTIN	HALBERT	C.R. 11 BRIDGE, 0.9 MI ESE SHOALS	38.661659	-86.781754
	1141	Cambarus	Lacunicambarus	diogenes	3	BC04121	7/20/04	MARTIN	HALBERT	C.R. 67 BRIDGE, OFF S.R. 650 AT U.S. GYPSUM TURN RIGHT, 3RD BRIDGE, 3.8 MI ENE SHOALS	38.679050	-86.717003
	1151	Cambarus	Lacunicambarus	diogenes	12	BC04126	7/21/04	MARTIN	HALBERT	C.R. 71 BRIDGE, 2.8 MI SW HURON	38.690079	-86.720886
	578	Cambarus	Lacunicambarus	diogenes	1	TPS04022	3/25/04	MONTGOMERY	SUGAR CREEK	C.R. 1000 N BRIDGE, 6.0 MI E LINDEN	40.187000	-86.774170
	579	Cambarus	Lacunicambarus	diogenes	2	TPS04023	3/25/04	MONTGOMERY	SUGAR CREEK	C.R. 800 E BRIDGE, 7.0 MI E LINDEN	40.163502	-86.752335
	3269	Cambarus	Lacunicambarus	diogenes	8	TPS06155	8/26/06	MORGAN	GREEN	ABRHAM ROAD OFF BRIAN CEMETERY ROAD, 2.0 MI NE OF COPE	39.469479	-86.298683
	3277	Cambarus	Lacunicambarus	diogenes	1	TPS06158	8/26/06	MORGAN	GREGG	C.R. 750 W, 3.0 MI SE OF CROWN CENTER	39.563999	-86.564110
	3284	Cambarus	Lacunicambarus	diogenes	2	TPS06161	8/26/06	MORGAN	HARRISON	WAVERLY BOAT LAUNCH ROAD, 1.0 MI NW OF WAVERLY	39.567261	-86.285812
	3280	Cambarus	Lacunicambarus	diogenes	1	TPS06159	8/26/06	MORGAN	MONROE	C.R. 950 N, 2.0 MI SE OF MONROVIA	39.564079	-86.453697
	3271	Cambarus	Lacunicambarus	diogenes	1	TPS06156	8/26/06	MORGAN	RAY	DUCKWORTH ROAD, 2.0 MI NE OF PARAGON	39.412601	-86.539917
	685	Cambarus	Lacunicambarus	diogenes	4	RFT04022	6/28/04	NEWTON	IROQUOIS	HANLEY RD., 0.5 MI NW OF BROOK	40.871140	-87.370010
	3355	Cambarus	Lacunicambarus	diogenes	4	TPS06111	9/29/06	NOBLE	GREEN	C.R. 500 S, 7.0 MI SE OF ALBION	41.278839	-85.336960

Table A-8. Locality records for *Cambarus diogenes* cont.												
OSU	**INBSC**	**GENUS**	**SUBGENUS**	**SPECIES**	**TOTAL**	**FieldNo**	**Date**	**County**	**Township**	**Locality 2**	**Lat**	**Long**
	3349	Cambarus	Lacunicambarus	diogenes	1	TPS06109	9/29/06	NOBLE	SPARTA	C.R. 450 N, 3.5 MI S OF LIGONIER	41.417542	-85.603149
	601	Cambarus	Lacunicambarus	diogenes	2	TPS04101	8/16/04	OHIO	CASS	DOWNEY CORNER RD. BRIDGE, 1.25 MI E OF DOWNEY CORNER	38.938610	-84.988335
	1080	Cambarus	Lacunicambarus	diogenes	2	LR04031	6/24/04	ORANGE	FRENCH LICK	U.S. 150 BRIDGE, 3.6 MI E WEST BADEN SPRINGS	38.572517	-86.541382
	1088	Cambarus	Lacunicambarus	diogenes	6	LR04048	6/29/04	ORANGE	FRENCH LICK	ABYDEL (ABYEDALE) ROAD BRIDGE, 1.4 MI E WEST BADEN SPRINGS	38.570782	-86.584610
	2123	Cambarus	Lacunicambarus	diogenes	1	LR04040	6/24/04	ORANGE	ORANGEVILLE	C.R. 500 W BRIDGE, 3.8 MI NE WEST BADEN SPRINGS	38.592930	-86.552628
	1161	Cambarus	Lacunicambarus	diogenes	1	TPS04110	9/11/04	OWEN	MONTGOMERY	C.R. 600 N BRIDGE, 4.5 MI W GOSPORT	39.378887	-86.760834
	1541	Cambarus	Lacunicambarus	diogenes	1	TPS05049	5/13/05	PERRY	OIL	C.R. 41A BRIDGE, 1.3 MI SE OF ST CROIX	38.215790	-86.577461
	1535	Cambarus	Lacunicambarus	diogenes	1	TPS05044	5/13/05	PERRY	TOBIN	C.R. 399 / TUMBLEWEED ROAD BRIDGE, 6.5 MI E OF CANNELTON	37.915169	-86.627823
	1538	Cambarus	Lacunicambarus	diogenes	2	TPS05045	5/12/05	PERRY	TOBIN	S.R. 66 BRIDGE, 0.5 MI E OF ROME	37.931198	-86.540451
	1810	Cambarus	Lacunicambarus	diogenes	1	TPS05046	5/13/05	PERRY	UNION	7 URBAN BRIDGE, 2.3 MI W OF DERBY	38.035198	-86.572159
	1808	Cambarus	Lacunicambarus	diogenes	7	TPS05047	5/13/05	PERRY	UNION	INTERSECTION OF 305 UKRAINE AND S.R. 66, 2.5 MI NE OF DERBY	38.060558	-86.491112
	3374	Cambarus	Lacunicambarus	diogenes	2	TPS05109	5/31/05	PIKE	CLAY	C.R. 850 W BRIDGE, 0.75 MI N OF UNION	38.475960	-87.435097
	3389	Cambarus	Lacunicambarus	diogenes	2	TPS05114	5/31/05	PIKE	JEFFERSON	C.R. 550 N BRIDGE, 2.5 MI NE OF ALGIERS	38.502510	-87.129280
	3382	Cambarus	Lacunicambarus	diogenes	2	TPS05112	5/31/05	PIKE	WASHINGTON	C.R. 300 N BRIDGE, 1.25 MI NE OF WILLISVILLE	38.465618	-87.281754
	626	Cambarus	Lacunicambarus	diogenes	1	RFT04003	6/14/04	PORTER	CENTER	C.R. 150 E, 0.7 MI S VALPARAISO	41.450371	-87.038109
	633	Cambarus	Lacunicambarus	diogenes	1	RFT04006	6/15/04	PORTER	LIBERTY	MERIDIAN RD., 1.0 MI W OF WOODVILLE	41.567051	-87.066010
	635	Cambarus	Lacunicambarus	diogenes	3	RFT04007	6/15/04	PORTER	UNION	S.R. 149 BRIDGE AND C.R. 500 N INTERSECTION, 1.9 MI SE VALPARAISO	41.507050	-87.125183
	1925	Cambarus	Lacunicambarus	diogenes	7	TPS05085	5/24/05	POSEY	BETHEL	C.R. 300 E BRIDGE, 3.0 MI E OF GRIFFIN	38.219711	-87.855331

Table A-8. Locality records for *Cambarus diogenes* cont.

OSU	INBSC	GENUS	SUBGENUS	SPECIES	TOTAL	FieldNo	Date	County	Township	Locality 2	Lat	Long
	1918	Cambarus	Lacunicambarus	diogenes	9	TPS05091	5/24/05	POSEY	BLACK	C.R. 350 S (COPPER LINE ROAD) BRIDGE, 1.4 MI SW OF SOLITUDE	37.988110	-87.926643
	1920	Cambarus	Lacunicambarus	diogenes	5	TPS05092	5/24/05	POSEY	LYNN	C.R. 175 N BRIDGE, 1.0 MI NW OF OLIVER	38.063358	-87.849297
	1942	Cambarus	Lacunicambarus	diogenes		TPS05093	5/24/05	POSEY	LYNN	S.R. 69 BRIDGE, 3.5 MI S OF NEW HARMONY	38.078388	-87.925529
	1911	Cambarus	Lacunicambarus	diogenes	4	TPS05087	5/24/05	POSEY	MARRS	C.R. 1000 E BRIDGE, 1.3 MI N OF ST PHILLIP	38.000542	-87.712486
	1938	Cambarus	Lacunicambarus	diogenes	5	TPS05089	5/24/05	POSEY	MARRS	C.R. 700 E (LOWER MT VERNON ROAD) BRIDGE, 5.75 MI E OF MT VERNON	37.929321	-87.789131
	1916	Cambarus	Lacunicambarus	diogenes	3	TPS05090	5/24/05	POSEY	POINT	C.R. 1300 S (RABEN ROAD) BRIDGE, 6.0 MI SW OF MT VERNON	37.852798	-87.983749
	1910	Cambarus	Lacunicambarus	diogenes	2	TPS05086	5/24/05	POSEY	SMITH	C.R. 600 N BRIDGE, 2.5 MI NE OF WADESVILLE	38.126141	-87.735924
	1757	Cambarus	Lacunicambarus	diogenes	15	RFT2005083	8/9/05	PULASKI	INDIAN CREEK	C.R. 325 W, 2.56 MI S OF PULASKI	40.939129	-86.668648
	1763	Cambarus	Lacunicambarus	diogenes	2	RFT2005085	8/9/05	PULASKI	MONROE	C.R. 300 S, 3.75 MI SW OF WINAMAC	41.011681	-86.658058
	1571	Cambarus	Lacunicambarus	diogenes	1	RFT2005016	6/15/05	RANDOLPH	WASHINGTON	C.R. 700 S, 7.5 MI S OF WINCHESTER	40.061890	-84.983093
	3361	Cambarus	Lacunicambarus	diogenes	1	TPS05061	5/17/05	RIPLEY	BROWN	S.R. 62, 0.0.1 MI W OF FRIENDSHIP	38.965729	-85.144272
	1847	Cambarus	Lacunicambarus	diogenes	1	TPS05058	5/17/05	RIPLEY	DELAWARE	C.R. 925 N, 3.75 MI E OF NAPOLEON	39.207218	-85.258942
	1851	Cambarus	Lacunicambarus	diogenes	3	TPS05059	5/17/05	RIPLEY	DELAWARE	N OLD MILAN ROAD, 3.7 MI NW OF PIERCEVILLE	39.185341	-85.191490
	1931	Cambarus	Lacunicambarus	diogenes	6	TPS05063	5/17/05	RIPLEY	SHELBY	C.R. 350 S, 4.75 MI SW OF VERSAILLES	39.038311	-85.335907
	1048	Cambarus	Lacunicambarus	diogenes	4	TPS05418	7/10/05	RUSH	ORANGE	C.R. 900 S, 2.5 MI SW OF MIDDLETOWN	39.482880	-85.607697
	1049	Cambarus	Lacunicambarus	diogenes	6	TPS05419	7/10/05	RUSH	ORANGE	C.R. 1000 S, 2.45 MI SE OF MOSCOW	39.467381	-85.521492
	1050	Cambarus	Lacunicambarus	diogenes	5	TPS05421	7/10/05	RUSH	RICHLAND	C.R. 250 E, 0.75 MI S OF RICHLAND	39.488750	-85.395203
	3412	Cambarus	Lacunicambarus	diogenes	5	TPS05123	6/2/05	SCOTT	FINLEY	LITTLE YORK ROAD BRIDGE, 4.25 MI NW OF SCOTTSBURG	38.700130	-85.869102
	3415	Cambarus	Lacunicambarus	diogenes	2	TPS05125	6/2/05	SCOTT	JENNINGS	S.R. 256, 1.25 MI E OF AUSTIN	38.743069	-85.780930
	3418	Cambarus	Lacunicambarus	diogenes	7	TPS05126	6/2/05	SCOTT	JENNINGS	BOGARDUS ROAD, 5.0 MI SW OF DEPUTY	38.800419	-85.758179

Table A-8. Locality records for *Cambarus diogenes* cont.												
OSU	INBSC	GENUS	SUBGENUS	SPECIES	TOTAL	FieldNo	Date	County	Township	Locality 2	Lat	Long
	3413	Cambarus	Lacunicambarus	diogenes	4	TPS05124	6/2/05	SCOTT	JOHNSON	MARSHFIELD ROAD BRIDGE, 2.0 MI S OF ALBION	38.715130	-85.742287
	1450	Cambarus	Lacunicambarus	diogenes	4	TPS05013	4/14/05	SCOTT	LEXINGTON	S.R. 203 BRIDGE, 2.0 MI NW OF LEXINGTON	38.672218	-85.646393
	1452	Cambarus	Lacunicambarus	diogenes	2	TPS05014	4/14/05	SCOTT	VIENNA	C.R. 150 S (LOVER'S LANE) BRIDGE, OFF C.R. 150 E (DOUBLE OR NOTHING ROAD), 2.5 MI SE OF SCOTTSBURG	38.671391	-85.738609
	1519	Cambarus	Lacunicambarus	diogenes	5	TPS05039	5/12/05	SPENCER	CLAY	C.R. 200 E BRIDGE, 5.5 MI W OF LAMAR	38.081718	-87.012894
	1513	Cambarus	Lacunicambarus	diogenes	1	TPS05037	5/12/05	SPENCER	GRASS	C.R. 600 N BRIDGE, 1.0 MI N OF RICHIE	37.974110	-87.039803
	1522	Cambarus	Lacunicambarus	diogenes	2	TPS05040	5/12/05	SPENCER	HARRISON	C.R. 1300 N BRIDGE, 1.0 MI N OF LAMAR	38.074440	-86.898689
	1525	Cambarus	Lacunicambarus	diogenes	1	TPS05041	5/12/05	SPENCER	HARRISON	C.R. 1400 N BRIDGE, 3.75 MI SE OF SANTA CLAUS	38.089260	-86.835136
	1528	Cambarus	Lacunicambarus	diogenes	1	TPS05042	5/12/05	SPENCER	HARRISON	C.R. 1100 E BRIDGE, 2.0 MI NW OF ST MEINRAD	38.192009	-86.844658
	1507	Cambarus	Lacunicambarus	diogenes	2	TPS05035	5/12/05	SPENCER	LUCE	C.R. 900 W BRIDGE, 0.1 MI W OF HATFIELD	37.883171	-87.215103
	1770	Cambarus	Lacunicambarus	diogenes	4	RFT2005090	8/10/05	STARKE	CENTER	C.R. 100 S, 1.25 MI SW OF KNOX	41.288090	-86.651901
	1771	Cambarus	Lacunicambarus	diogenes	7	RFT2005091	8/11/05	STARKE	CENTER	S.R. 8, 3.80 MI NW OF KNOX	41.317169	-86.690727
	1773	Cambarus	Lacunicambarus	diogenes	6	RFT2005092	8/11/05	STARKE	WASHINGTON	C.R. 300 S (TOTO ROAD), 4.48 MI NE OF BASS LAKE	41.259151	-86.551437
	1768	Cambarus	Lacunicambarus	diogenes	4	RFT2005087	8/10/05	STARKE	WAYNE	ADJACENT TO C.R. 300 S (EAST OF C.R. 400 W), 3.05 MI N OF NORTH JUDSON	41.250912	-86.773308
	3318	Cambarus	Lacunicambarus	diogenes	1	TPS06005A	9/29/06	STEUBEN	OTSEGO	C.R. 700 S, 7.0 MI SE OF ANGOLA	41.542709	-84.968559
	3317	Cambarus	Lacunicambarus	diogenes	1	TPS06007A	9/29/06	STEUBEN	YORK	C.R. 40 S, 9.0 MI E OF ANGOLA	41.639721	-84.817070
	509	Cambarus	Lacunicambarus	diogenes	2	TPS04081	8/4/04	SULLIVAN	JACKSON	C.R. 550 E, 2.75 MI S HYMERA	39.168330	-87.306110
	3363	Cambarus	Lacunicambarus	diogenes	3	TPS05103	5/26/05	VANDERBURGH	ARMSTRONG	BUENVISTA ROAD BRIDGE, 1.0 MI SW OF ARMSTRONG	38.102020	-87.664352

Table A-8. Locality records for *Cambarus diogenes* cont.												
OSU	**INBSC**	**GENUS**	**SUBGENUS**	**SPECIES**	**TOTAL**	**FieldNo**	**Date**	**County**	**Township**	**Locality 2**	**Lat**	**Long**
	3365	Cambarus	Lacunicambarus	diogenes	5	TPS05104	5/26/05	VANDERBURGH	GERMAN	NO. 6 SCHOOL ROAD BRIDGE, 1.0 MI SW OF ST JOSEPH	38.051701	-87.666153
	3367	Cambarus	Lacunicambarus	diogenes	2	TPS05105	5/26/05	VANDERBURGH	GERMAN	N ST JOSEPH ROAD BRIDGE, 2.0 MI E OF KASSON	38.019718	-87.599770
	1948	Cambarus	Lacunicambarus	diogenes	1	TPS05096	5/25/05	VANDERBURGH	KNIGHT	OLD BOONVILLE HIGHWAY BRIDGE, 6.0 MI E OF EVANSVILLE	37.999619	-87.478699
	1949	Cambarus	Lacunicambarus	diogenes	6	TPS05096	5/25/05	VANDERBURGH	KNIGHT	OLD BOONVILLE HIGHWAY BRIDGE, 6.0 MI E OF EVANSVILLE	37.999619	-87.478699
	1913	Cambarus	Lacunicambarus	diogenes	6	TPS05088	5/24/05	VANDERBURGH	UNION	SEMINARY ROAD BRIDGE, 2.0 MI SW OF VAUGHN	37.871540	-87.658173
	3394	Cambarus	Lacunicambarus	diogenes	1	TPS05116	6/1/05	VIGO	LINTON	SULLIVAN ROAD, 2.75 MI W OF PIMENTO	39.324371	-87.441017
	3405	Cambarus	Lacunicambarus	diogenes	1	TPS05121	6/3/05	VIGO	NEVINS	PETTIFORD ROAD BRIDGE, 2.45 MI NW OF SEELYVILLE	39.520809	-87.280434
	3409	Cambarus	Lacunicambarus	diogenes	1	TPS05122	6/1/05	VIGO	RILEY	S.R. 46 BRIDGE, 1.25 MI NW OF RILEY	39.404148	-87.321251
	3397	Cambarus	Lacunicambarus	diogenes	1	TPS05118	6/1/05	VIGO	SUGAR CREEK	SARAH MEYERS ROAD, 3.75 MI W OF WEST TERRE HAUTE	39.470009	-87.484703
	781	Cambarus	Lacunicambarus	diogenes	1	RFT04073	8/10/04	WARREN	ADAMS	C.R. 600 E AND C.R. 550 N INTERSECTION,	40.396671	-87.206238
	756	Cambarus	Lacunicambarus	diogenes	25	RFT04061	8/5/04	WARREN	LIBERTY	W DIVISION RD., N WEST LEBANON	40.316551	-87.373703
	1945	Cambarus	Lacunicambarus	diogenes	8	TPS05094	5/25/05	WARRICK	ANDERSON	C.R. 650 S BRIDGE, 1.0 MI N OF YANKEETOWN	37.938671	-87.263977
	2026	Cambarus	Lacunicambarus	diogenes	3	TPS05098	5/25/05	WARRICK	BOON	C.R. 400 N BRIDGE, 2.5 MI N OF BOONVILLE	38.088280	-87.250504
	1959	Cambarus	Lacunicambarus	diogenes	2	TPS05101	5/26/05	WARRICK	GREER	C.R. 68 BRIDGE, 4.0 MI W OF LYNNVILLE	38.194241	-87.378304
	1960	Cambarus	Lacunicambarus	diogenes	4	TPS05101	5/26/05	WARRICK	GREER	C.R. 68 BRIDGE, 4.0 MI W OF LYNNVILLE	38.194241	-87.378304
	1947	Cambarus	Lacunicambarus	diogenes	5	TPS05095	5/25/05	WARRICK	OHIO	C.R. 1000 W (GRIMM ROAD) BRIDGE, 2.0 MI W OF NEWBURGH	37.955429	-87.432381
	1952	Cambarus	Lacunicambarus	diogenes	4	TPS05097	5/25/05	WARRICK	OHIO	C.R. 50 S BRIDGE, 2.0 MI W OF CHANDLER	38.027279	-87.432388
	1962	Cambarus	Lacunicambarus	diogenes	3	TPS05102	5/25/05	WARRICK	OWEN	C.R. 850 N BRIDGE, 2.0 MI NE OF FOLSOMVILLE	38.151501	-87.140198

Table A-8. Locality records for *Cambarus diogenes* cont.

OSU	INBSC	GENUS	SUBGENUS	SPECIES	TOTAL	FieldNo	Date	County	Township	Locality 2	Lat	Long
	1956	Cambarus	Lacunicambarus	diogenes	1	TPS05099	5/25/05	WARRICK	SKELTON	S.R. 161 BRIDGE, 0.5 MI S OF TENNYSON	38.069859	-87.118301
	3514	Cambarus	Lacunicambarus	diogenes	1	TPS05175	6/28/05	WASHINGTON	BROWN	CAVETOWN ROAD BRIDGE, 0.3 MI W OF MT CARMEL	38.715370	-86.259819
	3509	Cambarus	Lacunicambarus	diogenes	4	TPS05173	6/28/05	WASHINGTON	GIBSON	E POWERLINE ROAD BRIDGE, 1.0 MI NE OF PUMPKIN CENTER	38.713970	-85.938782
	3512	Cambarus	Lacunicambarus	diogenes	4	TPS05174	6/28/05	WASHINGTON	MONROE	ROOSTER HILL ROAD BRIDGE, 1.5 MI E OF PITTSBURG	38.720181	-86.058853
	3237	Cambarus	Lacunicambarus	diogenes	1	RFT06072	7/6/06	WAYNE	JACKSON	EAST MILTON ROAD, 6.33 MI NW OF WATERLOO	39.787220	-85.150932
	3219	Cambarus	Lacunicambarus	diogenes	5	RFT06066	7/5/06	WAYNE	JEFFERSON	WEST SWOVELAND ROAD, 2.89 MI W OF GREENS FORK	39.888409	-85.096367
	3198	Cambarus	Lacunicambarus	diogenes	5	RFT06058	6/22/06	WHITLEY	COLUMBIA	C.R. 400 W, 3.47 MI SE OF LARWILL	41.155800	-85.567833

Table A-9. Locality records for *Fallicambarus fodiens* recorded for the base study 2004-2007.											
INBSC	**Genus**	**Subgenus**	**Species**	**Total**	**FieldNo**	**Date**	**County**	**Township**	**Locality**	**Lat**	**Long**
628	Fallicambarus	Creaserinus	fodiens	1	RFT04004	6/14/04	PORTER	UNION	C.R. 100 N (TALTREE ARBORETUM), 5.1 MI SW VALPARAISO	41.444950	-87.155952
2987	Fallicambarus	Creaserinus	fodiens	1	RFT06014	5/31/06	MIAMI	PERU	S.R. 19, 4.00 MI NE OF PERU	40.806789	-86.038490
3147	Fallicambarus	Creaserinus	fodiens	1	RFT06036	6/8/06	WELLS	LANCASTER	C.R. 600 E, 1.97 MI S OF TOCSIN	40.801411	-85.108452
3191	Fallicambarus	Creaserinus	fodiens	2	RFT06054	6/21/06	WHITLEY	JEFFERSON	C.R. 700 S, 4.48 MI NW OF ABOITE	41.063560	-85.342239
3197	Fallicambarus	Creaserinus	fodiens	6	RFT06057	6/22/06	WHITLEY	COLUMBIA	WASHINGTON ROAD, 4.12 MI SW OF COLUMBIA CITY	41.098751	-85.509377
3203	Fallicambarus	Creaserinus	fodiens	2	RFT06059	6/22/06	WHITLEY	JEFFERSON	C.R. 400 E, 2.41 MI NE OF LAUD	41.066029	-85.413078
3207	Fallicambarus	Creaserinus	fodiens	1	RFT06060	6/22/06	WHITLEY	JEFFERSON	PRIVATE DRIVE OFF C.R. 700 S, 3.75 MI NE OF LAUD	41.064941	-85.384308
3226	Fallicambarus	Creaserinus	fodiens	1	RFT06068	7/6/06	HENRY	HENRY	PARK ROAD (C.R. 275 W), JUST SOUTH OF PARK ENTRANCE, 2.28 MI NE OF GREENSBORO	39.900749	-85.438133
1573	Fallicambarus	Creaserinus	fodiens	3	RFT2005016	6/15/05	RANDOLPH	WASHINGTON	C.R. 700 S, 7.5 MI S OF WINCHESTER	40.061890	-84.983093
1668	Fallicambarus	Creaserinus	fodiens	2	RFT2005047	7/26/05	MADISON	ADAMS	S OF U.S. 36, 6.21 MI SW OF MIDDLETOWN	39.998859	-85.629189
537	Fallicambarus	Creaserinus	fodiens	9	TPS04095	8/11/04	GREENE	RICHLAND	0.5 MI E INTERSECTION OF C.R. 150 E AND C.R. 175 S, 1.5 MI SE BLOOMFIELD	38.882778	-86.959724
539	Fallicambarus	Creaserinus	fodiens	1	TPS04096	8/11/04	GREENE	STOCKTON	C.R. 1000 W, 3.0 MI NE LINTON	38.994167	-86.913055
1511	Fallicambarus	Creaserinus	fodiens	5	TPS05036	5/12/05	SPENCER	OHIO	S.R. 45 BRIDGE, 2.5 MI N OF ROCKPORT	37.858471	-87.066940
1516	Fallicambarus	Creaserinus	fodiens	1	TPS05037	5/12/05	SPENCER	GRASS	C.R. 600 N BRIDGE, 1.0 MI N OF RICHIE	37.974110	-87.039803
1523	Fallicambarus	Creaserinus	fodiens	1	TPS05040	5/12/05	SPENCER	HARRISON	C.R. 1300 N BRIDGE, 1.0 MI N OF LAMAR	38.074440	-86.898689
3372	Fallicambarus	Creaserinus	fodiens	1	TPS05108	5/31/05	PIKE	CLAY	C.R. 950 W BRIDGE, 2.7 MI SE OF IONA	38.513660	-87.446083
3376	Fallicambarus	Creaserinus	fodiens	1	TPS05109	5/31/05	PIKE	CLAY	C.R. 850 W BRIDGE, 0.75 MI N OF UNION	38.475960	-87.435097
3384	Fallicambarus	Creaserinus	fodiens	0	TPS05112	5/31/05	PIKE	WASHINGTON	C.R. 300 N BRIDGE, 1.25 MI NE OF WILLISVILLE	38.465618	-87.281754

Table A-10 Locality records for *Procambarus gracilis* recorded for the base study 2004-2007.

INBSC	Genus	Species	Total	FieldNo	Date	County	Township	Locality	Lat	Long
630	Procambarus	gracilis	7	RFT04004	6/14/04	PORTER	UNION	C.R. 100 N (TALTREE ARBORETUM), 5.1 MI SW VALPARAISO	41.444950	-87.155952
643	Procambarus	gracilis	1	RFT04008	6/15/04	PORTER	UNION	JONES RD. - SOUTH OF R.R. TRACKS, 0.5 MI W WHEELER	41.511559	-87.186241
646	Procambarus	gracilis	4	RFT04009	6/16/04	LAKE	NORTH	NORTHCOTE AVE. BRIDGE, 2.0 MI NW HIGHLAND	41.566330	-87.485817
870	Procambarus	gracilis	30	RFT04010	6/16/04	LAKE	NORTH	GRIFFITH MERRILLVILLE AIRPORT (WEST END), 1.75 MI SW GRIFFITH	41.522549	-87.390251
871	Procambarus	gracilis	1	RFT04011	6/16/04	LAKE	CEDAR CREEK	S.R. 55 BRIDGE, 3.75 MI N SHELBY	41.246811	-87.343651
657	Procambarus	gracilis	7	RFT04013	6/17/04	LAKE	CENTER	S.R. 53 BRIDGE, NE CROWN POINT	41.428391	-87.335312
684	Procambarus	gracilis	9	RFT04021	6/28/04	JASPER	CARPENTER	C.R. 1800 S, 2.0 MI ESE GOODLAND	40.751240	-87.254242
759	Procambarus	gracilis	1	RFT04061	8/5/04	WARREN	LIBERTY	W DIVISION RD., N WEST LEBANON	40.316551	-87.373703
770	Procambarus	gracilis	1	RFT04066	8/6/04	FOUNTAIN	CAIN	C.R. 200 S, SW HILLSBORO	40.096569	-87.192848
1017	Procambarus	gracilis	1	TPS04081	8/4/04	SULLIVAN	JACKSON	C.R. 550 E, 2.75 MI S HYMERA	39.168330	-87.306110

Table A-11. Locality records for *Cambarus ortmanni* recorded for the base study 2004-2007.											
OSU	INBSC	Genus	Species	Total	Field No	Date	County	Township	Locality	Lat	Long
	647	Cambarus	ortmanni	1	RFT04010	6/16/04	LAKE	NORTH	GRIFFITH MERRILLVILLE AIRPORT (WEST END), 1.75 MI SW GRIFFITH	41.522549	-87.390251
	772	Cambarus	ortmanni	1	RFT04068	8/9/04	TIPPECANOE	UNION	C.R. 600 S BRIDGE, SW TAYLOR	40.321461	-87.978600
	793	Cambarus	ortmanni	10	RFT04077	8/11/04	TIPPECANOE	SHELBY	C.R. 600 N BRIDGE, N MONTMORENCI	40.505619	-86.020447
	810	Cambarus	ortmanni	1	RFT04085	8/12/04	CARROLL	JEFFERSON	C.R. 70 W BRIDGE, N DELPHI	40.680351	-86.658974
	819	Cambarus	ortmanni	1	RFT04088	8/13/04	CARROLL	BURLINGTON	C.R. 500 E, SW CARROLLTON	40.507740	-86.430283
	821	Cambarus	ortmanni	2	RFT04089	8/13/04	CARROLL	BURLINGTON	S.R. 29 BRIDGE, 3.0 MI S CARROLLTON	40.486980	-86.394989
	2959	Cambarus	ortmanni	16	RFT06004	5/29/06	CASS	CLAY	C.R. 100 N, 2.79 MI NW OF NEW WAVERLY	40.779388	-86.242363
	2962	Cambarus	ortmanni	1	RFT06005	5/29/06	CASS	CLAY	C.R. 45 E, 3.64 MI NE OF LOGANSPORT	40.768291	-86.287422
	2964	Cambarus	ortmanni	5	RFT06006	5/30/06	CASS	JACKSON	C.R. 1000 E, 1.99 MI NW OF GALVESTON	40.604130	-86.184433
	2967	Cambarus	ortmanni	13	RFT06007	5/30/06	CASS	DEER CREEK	C.R. 200 E & C.R. 950 S, 2.87 MI NE OF DEER CREEK	40.626652	-86.335953
	2970	Cambarus	ortmanni	4	RFT06008	5/30/06	CASS	JEFFERSON	NEAR MOUTH W/ WABASH RIVER, 3.55 MI NW OF CLYMORS	40.730011	-86.510246
	2980	Cambarus	ortmanni	5	RFT06011	5/31/06	MIAMI	PIPE CREEK	C.R. 400 S, 3.94 MI NE OF ONWARD	40.707119	-86.121536
	2984	Cambarus	ortmanni	2	RFT06013	5/31/06	MIAMI	HARRISON	C.R. 950 S, 2.58 MI NW OF AMBOY	40.630100	-86.960533
	2986	Cambarus	ortmanni	2	RFT06014	5/31/06	MIAMI	PERU	S.R. 19, 4.00 MI NE OF PERU	40.806789	-86.038490
	3071	Cambarus	ortmanni	1	RFT06015	5/31/06	MIAMI	ERIE	C.R. 200 N, 5.33 MI NE OF PERU	40.793610	-85.982220
	3073	Cambarus	ortmanni	1	RFT06016	5/31/06	MIAMI	RICHLAND	C.R. 580 E, 3.15 MI SW OF ROANN	40.878681	-85.965797
	3080	Cambarus	ortmanni	2	RFT06018	6/1/06	WABASH	NOBLE	LAGRO ROAD, D/S CITY DUMP, 2.45 MI NE OF WABASH	40.817730	-85.782654
	3086	Cambarus	ortmanni	24	RFT06021	6/1/06	WABASH	CHESTER	C.R. 400 E, 2.37 MI E OF NORTH MANCHESTER	40.993801	-85.721977
	3089	Cambarus	ortmanni	3	RFT06022	6/1/06	WABASH	LAGRO	ROCK SPRINGS PIKE, 4.81 MI NW OF ANDREWS	40.907200	-85.671204
	3092	Cambarus	ortmanni	6	RFT06023	6/2/06	WABASH	WALTZ	S.R. 13, 5.08 MI S OF WABASH	40.730099	-85.828331
	3115	Cambarus	ortmanni	10	RFT06025	6/5/06	HUNTINGTON	LANCASTER	C.R. 200 S, 1.11 MI SE HARIANSBURG	40.799568	-85.556053
	3117	Cambarus	ortmanni	2	RFT06026	6/6/06	HUNTINGTON	JACKSON	C.R. 900 N, 3.63 MI W OF ROANOKE	40.960949	-85.441910
	3120	Cambarus	ortmanni	1	RFT06027	6/6/06	HUNTINGTON	HUNTINGTON	S.R. 9 & OLD S.R. 9, 3.19 MI SW OF HUNTINGTON	40.842140	-85.526627
	3123	Cambarus	ortmanni	3	RFT06028	6/6/06	HUNTINGTON	LANCASTER	S.R. 5, 6.86 MI N OF WARREN	40.780071	-85.455818
	3126	Cambarus	ortmanni	3	RFT06029	6/6/06	HUNTINGTON	ROCK CREEK	C.R. 300 E, 1.68 MI SE OF TOLEDO	40.795280	-85.392967
	3129	Cambarus	ortmanni	5	RFT06030	6/7/06	HUNTINGTON	SALAMONIE	S.R. 5, 2.79 MI S OF MAJENICA	40.732071	-85.440567
	3134	Cambarus	ortmanni	1	RFT06032	6/7/06	WELLS	LIBERTY	C.R. 500 S, 2.26 MI SW OF LIBERTY CENTER	40.668911	-85.298599
	3137	Cambarus	ortmanni	5	RFT06033	6/7/06	WELLS	ROCK CREEK	C.R. 200 N, 4.23 MI SE OF MARKLE	40.770981	-85.308907
	3140	Cambarus	ortmanni	8	RFT06034	6/8/06	WELLS	UNION	C.R. 300 W, 5.67 MI NW OF UNIONDALE	40.907330	-85.280128
	3142	Cambarus	ortmanni	7	RFT06035	6/8/06	WELLS	JEFFERSON	C.R. 800 N & C.R. 650 E, 2.06 MI N OF TOCSIN	40.859322	-85.100700
	3146	Cambarus	ortmanni	17	RFT06036	6/8/06	WELLS	LANCASTER	C.R. 600 E, 1.97 MI S OF TOCSIN	40.801411	-85.108452

Table A-11. Locality records for *Cambarus ortmanni* cont.											
OSU	**INBSC**	**Genus**	**Species**	**Total**	**Field No**	**Date**	**County**	**Township**	**Locality**	**Lat**	**Long**
	3148	Cambarus	ortmanni	17	RFT06037	6/8/06	WELLS	LANCASTER	C.R. 200 N, 1.29 MI SW OF CRAIGVILLE	40.771870	-85.114113
	3150	Cambarus	ortmanni	1	RFT06038	6/8/06	WELLS	NOTTINGHAM	C.R. 1000 S, 1.51 MI SW OF DOMESTIC	40.596989	-85.109161
	3153	Cambarus	ortmanni	2	RFT06040	6/9/06	ADAMS	MONROE	C.R. 400 S, 3.31 MI NE OF BERNE	40.680279	-84.896797
	3158	Cambarus	ortmanni	6	RFT06042	6/19/06	ADAMS	PREBLE	C.R. 900 N, 5.15 MI SW OF WILLIAMS	40.874908	-85.055862
	3162	Cambarus	ortmanni	3	RFT06043	6/19/06	ADAMS	PREBLE	C.R. 750 N, 5.72 MI SW OF WILLIAMS	40.853321	-85.044113
	3165	Cambarus	ortmanni	17	RFT06044	6/19/06	ADAMS	PLEASANT	PLEASANT CENTER ROAD BRIDGE, 2.01 MI S OF BAERFIELD	40.959999	-85.192421
	3206	Cambarus	ortmanni	2	RFT06060	6/22/06	WHITLEY	JEFFERSON	PRIVATE DRIVE OFF C.R. 700 S, 3.75 MI NE OF LAUD	41.064941	-85.384308
	3216	Cambarus	ortmanni	2	RFT06065	7/5/06	WAYNE	JEFFERSON	S.R. 1, 1.29 MI NE OF HAGERSTOWN	39.923672	-85.142883
	3234	Cambarus	ortmanni	3	RFT06071	7/6/06	HENRY	DUDLEY	C.R. 425 E, 2.54 MI E OF LEWISVILLE	39.802589	-85.305367
	3239	Cambarus	ortmanni	1	RFT06072	7/6/06	WAYNE	JACKSON	EAST MILTON ROAD, 6.33 MI NW OF WATERLOO	39.787220	-85.150932
	3245	Cambarus	ortmanni	5	RFT06074	7/7/06	WAYNE	CLAY	N CARLOS ROAD, 4.74 MI W OF WEBSTER	39.903259	-85.033928
	1545	Cambarus	ortmanni	2	RFT2005007	6/13/05	DELAWARE	PERRY	S C.R. 750 E, 2.0 MI SE OF SMITHFIELD	40.148739	-85.244400
	1548	Cambarus	ortmanni	13	RFT2005008	6/13/05	DELAWARE	HARRISON	N C.R. 950 W, 0.67 MI SE OF GILMAN	40.229408	-85.566193
	1552	Cambarus	ortmanni	2	RFT2005010	6/14/05	DELAWARE	HARRISON	C.R. 675 W, 1.75 MI NE OF BETHEL	40.270432	-85.515289
	1554	Cambarus	ortmanni	5	RFT2005011	6/14/05	DELAWARE	HAMILTON	N CENTRAL AVENUE, 1.5 MI NW OF ROVERTON	40.277931	-85.386436
	1561	Cambarus	ortmanni	2	RFT2005013	6/14/05	RANDOLPH	WHITE RIVER	S HUNTSVILLE ROAD, 3.125 MI S OF WINCHESTER	40.131222	-85.005341
	1565	Cambarus	ortmanni	7	RFT2005014	6/14/05	RANDOLPH	WHITE RIVER	BASE ROAD, 2.13 MI N OF RURAL	40.134579	-84.976768
	1572	Cambarus	ortmanni	1	RFT2005016	6/15/05	RANDOLPH	WASHINGTON	C.R. 700 S, 7.5 MI S OF WINCHESTER	40.061890	-84.983093
	1575	Cambarus	ortmanni	6	RFT2005017	6/15/05	RANDOLPH	UNION	C.R. 700 S, 2.55 MI NW OF LYNN	40.061989	-85.119629
	1577	Cambarus	ortmanni	11	RFT2005018	6/16/05	DELAWARE	WAYNE	C.R. 625 E, 1.7 MI SE OF HARRISVILLE	40.168091	-85.857964
	1581	Cambarus	ortmanni	7	RFT2005019	6/16/05	DELAWARE	GREENS FORK	S ARBA PIKE, 1.58 MI S OF BURTONIA	40.092548	-84.851547
	1584	Cambarus	ortmanni	1	RFT2005020	6/16/05	RANDOLPH	JACKSON	C.R. 800 N, 2.24 MI SE OF NEW PITTSBURG	40.280331	-84.873497
	1587	Cambarus	ortmanni	1	RFT2005021	6/16/05	JAY	MADISON	C.R. 150 S, 2.88 MI NE OF BONDARY CITY	40.367809	-84.876289
	1590	Cambarus	ortmanni	1	RFT2005022	6/17/05	JAY	PIKE	C.R. 134 S, 1.48 MI SW OF GREENE	40.388031	-85.109627
	1592	Cambarus	ortmanni	1	RFT2005023	6/17/05	JAY	PIKE	C.R. 140 S, 2.19 MI NW OF ANTIOCH	40.381889	-84.951027

Table A-11. Locality records for *Cambarus ortmanni* cont.											
OSU	**INBSC**	**Genus**	**Species**	**Total**	**Field No**	**Date**	**County**	**Township**	**Locality**	**Lat**	**Long**
	1594	Cambarus	ortmanni	11	RFT2005024	6/29/05	JAY	NOBLE	C.R. 200 S, 1.02 MI SE OF BRICE	40.411560	-84.878906
	1596	Cambarus	ortmanni	24	RFT2005025	6/29/05	JAY	NOBLE	C.R. 191 E, 2.92 MI SE OF WEST CHESTER	40.457470	-84.882874
	1611	Cambarus	ortmanni	1	RFT2005030	6/30/05	BLACKFORD	LICKING	MAHEE ROAD, 3.87 MI NW OF EATON	40.382530	-85.412079
	1614	Cambarus	ortmanni	2	RFT2005031	7/1/05	BLACKFORD	WASHINGTON	C.R. 600 N, 1.05 MI SW OF ROLL	40.538052	-85.397247
	1628	Cambarus	ortmanni	11	RFT2005035	7/5/05	GRANT	JEFFERSON	C.R. 600 E, 1.26 MI SE OF FOWLERTON	40.394020	-85.559380
	1631	Cambarus	ortmanni	6	RFT2005036	7/5/05	GRANT	JEFFERSON	S.R. 22, 4.97 MI E OF GAS CITY	40.480381	-85.518829
	1635	Cambarus	ortmanni	19	RFT2005037	7/5/05	GRANT	JEFFERSON	S WHEELING PIKE, 1.59 MI NW OF MATTHEWS	40.407040	-85.518066
	1643	Cambarus	ortmanni	3	RFT2005040	7/6/05	GRANT	WASHINGTON	C.R. 650 N, 6.62 MI NE OF MARION	40.617119	-85.612106
	1646	Cambarus	ortmanni	4	RFT2005041	7/6/05	GRANT	FRANKLIN	C.R. 400 W, 1.24 MI SW OF ROSEBURG	40.512341	-85.748459
	1653	Cambarus	ortmanni	3	RFT2005043	7/7/05	HOWARD	HOWARD	C.R. 300 N, 2.51 MI N OF VERMONT	40.520962	-86.027313
	1657	Cambarus	ortmanni	1	RFT2005044	7/7/05	HOWARD	HOWARD	C.R. 400 N, 5.24 MI NE OF KOKOMO	40.535500	-86.057533
	1665	Cambarus	ortmanni	3	RFT2005046	7/7/05	HOWARD	TAYLOR	C.R. 250 E, 2.00 MI W OF HEMLOCK	40.421478	-86.078911
	1672	Cambarus	ortmanni	1	RFT2005048	7/26/05	MADISON	UNION	U.S. 236, 3.09 MI W OF MIDDLETOWN	40.064121	-85.594147
	1678	Cambarus	ortmanni	2	RFT2005050	7/26/05	MADISON	JACKSON	C.R. 500 W & W 8TH STREET, 2.25 MI NW OF EGEWOOD	40.121078	-85.767197
	1681	Cambarus	ortmanni	2	RFT2005051	7/27/05	MADISON	UNION	C.R. 200 S, 3.92 MI NW OF MIDDLETOWN	40.077740	-85.606850
	1683	Cambarus	ortmanni	3	RFT2005052	7/27/05	MADISON	MONROE	C.R. 425 E, 2.20 MI NE OF MOONVILLE	40.224720	-85.590103
	1693	Cambarus	ortmanni	4	RFT2005055	7/28/05	HOWARD	MONROE	C.R. 300 S, 2.66 MI NE OF RUSSIAVILLE	40.431591	-86.318802
	1793	Cambarus	ortmanni	4	RFT2005102	8/23/05	CARROLL	WASHINGTON	C.R. 500 E, 2.40 MI NW OF DEER CREEK	40.630409	-86.429657
	1794	Cambarus	ortmanni	4	RFT2005103	8/23/05	CARROLL	WASHINGTON	C.R. 500 E, 4.35 MI SE OF BURROWS	40.653450	-86.429626
	546	Cambarus	ortmanni	4	TPS04099	8/16/04	OHIO	RANDOLPH	S.R. 56 BRIDGE, 0.25 MI N OF FRENCH	39.025833	-84.884720
	1489	Cambarus	ortmanni	2	TPS05028	5/11/05	DUBOIS	HARRISON	C.R. 500 E BRIDGE, 2.2 MI N OF KELLERVILLE	38.508240	-86.826752
	1841	Cambarus	ortmanni	1	TPS05055	5/16/05	DEARBORN	HOGAN	CHESTERVILLE ROAD, 3.75 MI W OF AURORA	39.048149	-84.971077

Table A-11. Locality records for *Cambarus ortmanni* cont.											
OSU	**INBSC**	**Genus**	**Species**	**Total**	**Field No**	**Date**	**County**	**Township**	**Locality**	**Lat**	**Long**
	1856	Cambarus	ortmanni	1	TPS05060	5/17/05	RIPLEY	WASHINGTON	C.R. 625 E, 5.0 MI E OF VERSAILLES	39.065250	-85.144180
	3387	Cambarus	ortmanni	1	TPS05113	5/31/05	PIKE	WASHINGTON	C.R. 650 N BRIDGE, 3.2 MI NE OF PETERSBURG	38.517818	-87.219612
6445		Cambarus	ortmanni	2	RFT07004	6/19/07	Union	Harrison	unnamed trib of Smith Creek, bridge on Co Rd. 200E, NW of Witts Station,	39.725290	-84.889950
6444		Cambarus	ortmanni	2	RFT07008	6/19/07	Fayette	Jennings	Village Creek, bridge on CO Rd. 450E, N of Alquina,	39.625030	-85.054040
6437		Cambarus	ortmanni	4	RFT07013	6/20/07	Fayette	Posey	unnamed trib of Shawnee Creek, bridge on CO Rd. 800E, N of Fairview,	39.717810	-85.301050
6464		Cambarus	ortmanni	4	RFT07002	6/18/07	Union	Harrison	Nutter Creek, bridge on CO Rd 400E, NW of Goodwins Corner,	39.664040	-84.852920
6457		Cambarus	ortmanni	4	RFT07003	6/18/07	Union	Harrison	unnamed trib of Church Creek, bridge on IN Rt. 224, NE of Kitchel,	39.697160	-84.838130

Appendix 2

Task 2

Life History

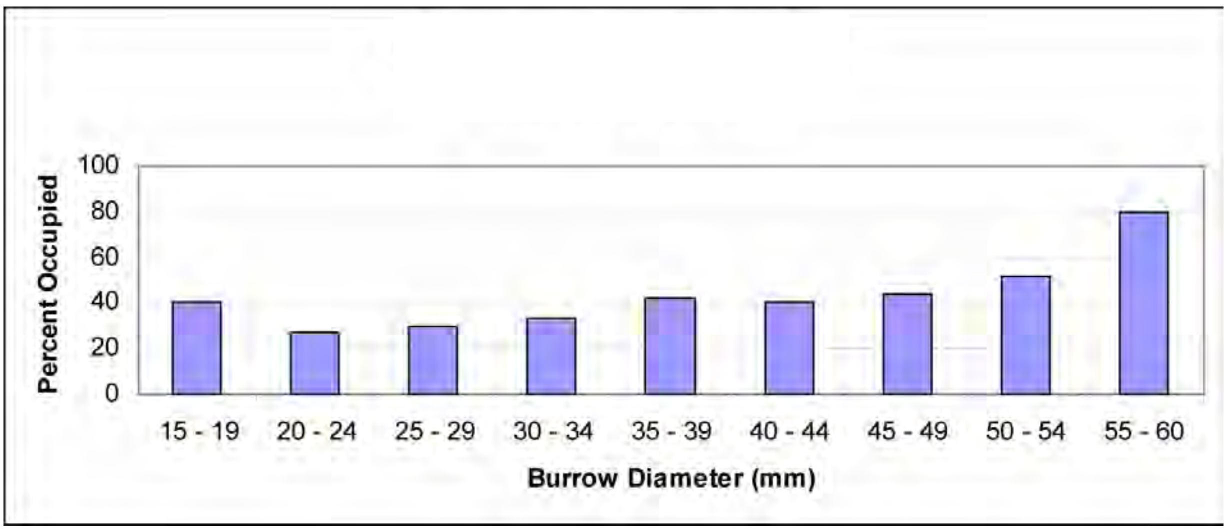

Table B-8. Sex ratios of primary burrowing crayfish in Indiana by county.

Genus	Subgenus	Species	County	Total	% Males	Total Males	M1	M2	JUV-M	% Females	Total Females	F	OVIG	JUV-F	JUVS
Cambarus	Cambarus	ortmanni	Adams	28	60.7%	17	1	2	14	39.3%	11	3	0	8	0
Cambarus	Cambarus	ortmanni	Blackford	3	66.7%	2	0	1	1	33.3%	1	1	0	0	0
Cambarus	Cambarus	ortmanni	Carroll	12	16.7%	2	1	1	0	66.7%	8	8	0	0	2
Cambarus	Cambarus	ortmanni	Cass	39	51.3%	20	1	5	14	46.2%	18	7	0	11	0
Cambarus	Cambarus	ortmanni	Dearborn	1	0.0%	0	0	0	0	100.0%	1	1	0	0	0
Cambarus	Cambarus	ortmanni	Delaware	40	52.5%	21	0	9	12	47.5%	19	8	0	11	0
Cambarus	Cambarus	ortmanni	Dubois	2	0.0%	0	0	0	0	0.0%	0	0	0	0	2
Cambarus	Cambarus	ortmanni	Grant	43	37.2%	16	1	4	11	60.5%	26	4	2	20	0
Cambarus	Cambarus	ortmanni	Henry	3	33.3%	1	0	0	1	66.7%	2	1	1	0	0
Cambarus	Cambarus	ortmanni	Howard	11	36.4%	4	1	3	0	63.6%	7	7	0	0	0
Cambarus	Cambarus	ortmanni	Huntington	24	54.2%	13	1	4	8	45.8%	11	4	0	7	0
Cambarus	Cambarus	ortmanni	Jay	38	42.1%	16	0	3	13	36.8%	14	4	2	8	7
Cambarus	Cambarus	ortmanni	Jefferson	2	100.0%	2	1	1	0	0.0%	0	0	0	0	0
Cambarus	Cambarus	ortmanni	Lake	1	100.0%	1	0	1	0	0.0%	0	0	0	0	0
Cambarus	Cambarus	ortmanni	Madison	8	37.5%	3	0	3	0	62.5%	5	3	2	0	0
Cambarus	Cambarus	ortmanni	Miami	11	27.3%	3	0	2	1	72.7%	8	5	0	3	0
Cambarus	Cambarus	ortmanni	Ohio	4	50.0%	2	0	2	0	50.0%	2	2	0	0	0
Cambarus	Cambarus	ortmanni	Pike	1	0.0%	0	0	0	0	100.0%	1	1	0	0	0
Cambarus	Cambarus	ortmanni	Randolph	17	47.1%	8	0	2	6	52.9%	9	5	0	4	0
Cambarus	Cambarus	ortmanni	Ripley	14	21.4%	3	0	3	0	78.6%	11	11	0	0	0
Cambarus	Cambarus	ortmanni	Tippecanoe	11	63.6%	7	0	7	0	36.4%	4	4	0	0	0
Cambarus	Cambarus	ortmanni	Wabash	35	48.6%	17	2	3	12	51.4%	18	6	0	12	0
Cambarus	Cambarus	ortmanni	Wayne	8	12.5%	1	0	1	0	87.5%	7	5	0	2	0
Cambarus	Cambarus	ortmanni	Wells	56	35.7%	20	3	5	12	64.3%	36	18	0	18	0
Cambarus	Cambarus	ortmanni	Whitley	2	0.0%	0	0	0	0	100.0%	2	0	1	1	0
Cambarus	Lacunicambarus	diogenes	Adams	6	16.7%	1	1	0	0	83.3%	5	5	0	0	0
Cambarus	Lacunicambarus	diogenes	Allen	1	100.0%	1	0	1	0	0.0%	0	0	0	0	0
Cambarus	Lacunicambarus	diogenes	Bartholomew	7	85.7%	6	4	2	0	14.3%	1	0	1	0	0
Cambarus	Lacunicambarus	diogenes	Blackford	8	50.0%	4	0	3	1	50.0%	4	2	0	2	0
Cambarus	Lacunicambarus	diogenes	Brown	1	100.0%	1	0	1	0	0.0%	0	0	0	0	0
Cambarus	Lacunicambarus	diogenes	Clark	8	50.0%	4	0	4	0	50.0%	4	4	0	0	0
Cambarus	Lacunicambarus	diogenes	Clay	12	75.0%	9	3	6	0	25.0%	3	3	0	0	0
Cambarus	Lacunicambarus	diogenes	Clinton	2	0.0%	0	0	0	0	0.0%	0	0	0	0	2
Cambarus	Lacunicambarus	diogenes	Crawford	5	20.0%	1	0	1	0	80.0%	4	4	0	0	0
Cambarus	Lacunicambarus	diogenes	Daviess	12	66.7%	8	0	8	0	33.3%	4	4	0	0	0
Cambarus	Lacunicambarus	diogenes	Dearborn	7	42.9%	3	2	1	0	57.1%	4	3	1	0	0
Cambarus	Lacunicambarus	diogenes	Decatur	10	40.0%	4	1	3	0	60.0%	6	5	1	0	0
Cambarus	Lacunicambarus	diogenes	Dekalb	7	28.6%	2	0	2	0	71.4%	5	5	0	0	0
Cambarus	Lacunicambarus	diogenes	Delaware	10	20.0%	2	0	2	0	80.0%	8	7	0	1	0
Cambarus	Lacunicambarus	diogenes	Door	1	100.0%	1	0	1	0	0.0%	0	0	0	0	0
Cambarus	Lacunicambarus	diogenes	Dubois	16	50.0%	8	3	5	0	12.5%	2	2	0	0	3
Cambarus	Lacunicambarus	diogenes	Floyd	1	100.0%	1	1	0	0	0.0%	0	0	0	0	0
Cambarus	Lacunicambarus	diogenes	Franklin	2	100.0%	2	0	2	0	0.0%	0	0	0	0	0

Table B-8. Sex ratios of primary burrowing crayfish in Indiana by county.

Cambarus	Lacunicambarus	diogenes	Fulton	2	100.0%	2	1	0	1	0.0%	0	0	0	0	0
Cambarus	Lacunicambarus	diogenes	Gibson	32	43.8%	14	6	8	0	40.6%	13	12	1	0	5
Cambarus	Lacunicambarus	diogenes	Greene	13	38.5%	5	0	2	3	53.8%	7	6	0	1	0
Cambarus	Lacunicambarus	diogenes	Hamilton	14	35.7%	5	1	4	0	57.1%	8	8	0	0	1
Cambarus	Lacunicambarus	diogenes	Hendricks	7	57.1%	4	1	1	2	42.9%	3	3	0	0	0
Cambarus	Lacunicambarus	diogenes	Henry	6	50.0%	3	0	1	2	50.0%	3	3	0	0	0
Cambarus	Lacunicambarus	diogenes	Howard	5	20.0%	1	0	1	0	80.0%	4	4	0	0	0
Cambarus	Lacunicambarus	diogenes	Huntington	6	50.0%	3	3	0	0	50.0%	3	3	0	0	0
Cambarus	Lacunicambarus	diogenes	Jackson	14	57.1%	8	5	3	0	42.9%	6	6	0	0	0
Cambarus	Lacunicambarus	diogenes	Jasper	6	50.0%	3	0	3	0	0.0%	0	0	0	0	3
Cambarus	Lacunicambarus	diogenes	Jefferson	3	0.0%	0	0	0	0	100.0%	3	3	0	0	0
Cambarus	Lacunicambarus	diogenes	Jennings	8	62.5%	5	3	2	0	37.5%	3	3	0	0	0
Cambarus	Lacunicambarus	diogenes	Johnson	23	21.7%	5	2	3	0	78.3%	18	13	0	5	0
Cambarus	Lacunicambarus	diogenes	Knox	59	44.1%	26	14	9	3	55.9%	33	28	0	5	0
Cambarus	Lacunicambarus	diogenes	Lagrange	2	0.0%	0	0	0	0	100.0%	2	2	0	0	0
Cambarus	Lacunicambarus	diogenes	Lake	5	0.0%	0	0	0	0	100.0%	5	5	0	0	0
Cambarus	Lacunicambarus	diogenes	Laporte	11	54.5%	6	0	6	0	45.5%	5	5	0	0	0
Cambarus	Lacunicambarus	diogenes	Lawrence	9	22.2%	2	0	2	0	77.8%	7	7	0	0	0
Cambarus	Lacunicambarus	diogenes	Livingston	2	50.0%	1	1	0	0	50.0%	1	1	0	0	0
Cambarus	Lacunicambarus	diogenes	Macomb	2	0.0%	0	0	0	0	100.0%	2	2	0	0	0
Cambarus	Lacunicambarus	diogenes	Madison	10	40.0%	4	0	4	0	60.0%	6	6	0	0	0
Cambarus	Lacunicambarus	diogenes	Marion	12	58.3%	7	1	6	0	41.7%	5	5	0	0	0
Cambarus	Lacunicambarus	diogenes	Marshall	2	50.0%	1	0	1	0	50.0%	1	1	0	0	0
Cambarus	Lacunicambarus	diogenes	Martin	20	40.0%	8	4	2	2	60.0%	12	10	0	2	0
Cambarus	Lacunicambarus	diogenes	Monroe	15	53.3%	8	3	4	1	46.7%	7	7	0	0	0
Cambarus	Lacunicambarus	diogenes	Montgomery	3	66.7%	2	2	0	0	0.0%	0	0	0	0	0
Cambarus	Lacunicambarus	diogenes	Morgan	13	46.2%	6	1	5	0	53.8%	7	6	0	1	0
Cambarus	Lacunicambarus	diogenes	Newton	4	0.0%	0	0	0	0	100.0%	4	4	0	0	0
Cambarus	Lacunicambarus	diogenes	Noble	5	0.0%	0	0	0	0	100.0%	5	5	0	0	0
Cambarus	Lacunicambarus	diogenes	Ohio	2											
Cambarus	Lacunicambarus	diogenes	Orange	38	31.6%	12	3	9	0	50.0%	19	11	0	8	9
Cambarus	Lacunicambarus	diogenes	Owen	1	100.0%	1	0	1	0	0.0%	0	0	0	0	0
Cambarus	Lacunicambarus	diogenes	Perry	18	50.0%	9	4	5	0	44.4%	8	7	0	1	0
Cambarus	Lacunicambarus	diogenes	Pike	8	50.0%	4	1	3	0	37.5%	3	3	0	0	1
Cambarus	Lacunicambarus	diogenes	Porter	5	40.0%	2	0	2	0	60.0%	3	2	0	1	0
Cambarus	Lacunicambarus	diogenes	Posey	18	33.3%	6	3	3	0	55.6%	10	9	0	1	1
Cambarus	Lacunicambarus	diogenes	Pulaski	17	47.1%	8	0	4	4	52.9%	9	4	0	5	0
Cambarus	Lacunicambarus	diogenes	Randolph	1	0.0%	0	0	0	0	100.0%	1	1	0	0	0
Cambarus	Lacunicambarus	diogenes	Ripley	101	19.8%	20	6	14	0	64.4%	65	62	2	1	26
Cambarus	Lacunicambarus	diogenes	Rush	15	13.3%	2	2	0	0	20.0%	3	3	0	0	0
Cambarus	Lacunicambarus	diogenes	Scott	24	37.5%	9	6	3	0	62.5%	15	15	0	0	0
Cambarus	Lacunicambarus	diogenes	Spencer	14	50.0%	7	4	3	0	35.7%	5	5	0	0	2
Cambarus	Lacunicambarus	diogenes	Starke	21	42.9%	9	1	6	2	57.1%	12	8	0	4	0
Cambarus	Lacunicambarus	diogenes	Steuben	2	50.0%	1	1	0	0	50.0%	1	1	0	0	0
Cambarus	Lacunicambarus	diogenes	Sullivan	6	33.3%	2	1	1	0	50.0%	3	3	0	0	1

Table B-8. Sex ratios of primary burrowing crayfish in Indiana by county.

Cambarus	Lacunicambarus	diogenes	Vanderburgh	17	52.9%	9	7	2	0	41.2%	7	7	0	0	1
Cambarus	Lacunicambarus	diogenes	Vigo	28	53.6%	15	11	4	0	46.4%	13	13	0	0	0
Cambarus	Lacunicambarus	diogenes	Warren	26	3.8%	1	0	0	1	0.0%	0	0	0	0	25
Cambarus	Lacunicambarus	diogenes	Warrick	5	60.0%	3	2	1	0	0.0%	0	0	0	0	2
Cambarus	Lacunicambarus	diogenes	Washington	5	40.0%	2	0	2	0	60.0%	3	3	0	0	0
Cambarus	Lacunicambarus	diogenes	Wayne	6	50.0%	3	2	1	0	50.0%	3	3	0	0	0
Cambarus	Lacunicambarus	diogenes	Whitley	5	40.0%	2	0	2	0	60.0%	3	3	0	0	0
Cambarus	Tubericambarus	polychromatus	Adams	25	20.0%	5	2	2	1	48.0%	12	11	1	0	8
Cambarus	Tubericambarus	polychromatus	Allen	35	54.3%	19	2	17	0	45.7%	16	16	0	0	0
Cambarus	Tubericambarus	polychromatus	Bartholomew	7	57.1%	4	1	3	0	28.6%	2	2	0	0	0
Cambarus	Tubericambarus	polychromatus	Benton	46	47.8%	22	0	6	16	47.8%	22	12	0	10	2
Cambarus	Tubericambarus	polychromatus	Blackford	50	42.0%	21	1	2	18	56.0%	28	10	0	18	0
Cambarus	Tubericambarus	polychromatus	Boone	37	54.1%	20	1	11	8	45.9%	17	13	0	4	0
Cambarus	Tubericambarus	polychromatus	Breckinridge	1	0.0%	0	0	0	0	100.0%	1	1	0	0	0
Cambarus	Tubericambarus	polychromatus	Brown	15	46.7%	7	2	6	0	40.0%	6	5	0	1	0
Cambarus	Tubericambarus	polychromatus	Carroll	12	41.7%	5	1	2	2	58.3%	7	4	0	3	0
Cambarus	Tubericambarus	polychromatus	Cass	22	63.6%	14	0	13	1	36.4%	8	8	0	0	0
Cambarus	Tubericambarus	polychromatus	Clark	1	0.0%	0	0	0	0	100.0%	1	1	0	0	0
Cambarus	Tubericambarus	polychromatus	Clay	49	46.9%	23	9	14	0	61.2%	30	24	5	1	0
Cambarus	Tubericambarus	polychromatus	Clinton	2	50.0%	1	0	0	1	0.0%	0	0	0	0	0
Cambarus	Tubericambarus	polychromatus	Crawford	27	33.3%	9	2	4	3	44.4%	12	12	0	0	3
Cambarus	Tubericambarus	polychromatus	Daviess	31	48.4%	15	0	1	14	45.2%	14	2	0	12	2
Cambarus	Tubericambarus	polychromatus	Decatur	9	66.7%	6	3	1	2	22.2%	2	1	0	1	0
Cambarus	Tubericambarus	polychromatus	Dekalb	2	50.0%	1	0	1	0	50.0%	1	1	0	0	0
Cambarus	Tubericambarus	polychromatus	Delaware	48	37.5%	18	3	6	9	37.5%	18	11	1	6	12
Cambarus	Tubericambarus	polychromatus	Dubois	79	12.7%	10	6	3	1	16.5%	13	7	5	1	42
Cambarus	Tubericambarus	polychromatus	Elkhart	20	30.0%	6	1	5	0	45.0%	9	9	0	0	7
Cambarus	Tubericambarus	polychromatus	Floyd	6	50.0%	3	3	0	0	50.0%	3	3	0	0	0
Cambarus	Tubericambarus	polychromatus	Fountain	22	63.6%	14	2	12	0	36.4%	8	7	0	1	0
Cambarus	Tubericambarus	polychromatus	Franklin	7	14.3%	1	0	0	1	85.7%	6	4	0	2	0
Cambarus	Tubericambarus	polychromatus	Fulton	30	53.3%	16	3	11	2	46.7%	14	13	0	1	0
Cambarus	Tubericambarus	polychromatus	Gibson	19	31.6%	6	5	0	1	36.8%	7	6	1	0	2
Cambarus	Tubericambarus	polychromatus	Grant	24	33.3%	8	1	5	2	37.5%	9	5	0	4	7
Cambarus	Tubericambarus	polychromatus	Greene	86	37.2%	32	11	16	5	60.5%	52	42	1	9	4
Cambarus	Tubericambarus	polychromatus	Hamilton	15	40.0%	6	1	5	0	60.0%	9	8	1	0	0
Cambarus	Tubericambarus	polychromatus	Harrison	4	50.0%	2	1	1	0	50.0%	2	2	0	0	0
Cambarus	Tubericambarus	polychromatus	Hendricks	22	45.5%	10	1	5	4	50.0%	11	8	0	3	1
Cambarus	Tubericambarus	polychromatus	Henry	51	51.0%	26	2	13	11	49.0%	25	13	1	11	0
Cambarus	Tubericambarus	polychromatus	Howard	52	48.1%	25	1	8	16	48.1%	25	14	0	11	2
Cambarus	Tubericambarus	polychromatus	Huntington	17	52.9%	9	2	7	0	47.1%	8	8	0	0	0
Cambarus	Tubericambarus	polychromatus	Jackson	3	0.0%	0	0	0	0	100.0%	3	3	0	0	0
Cambarus	Tubericambarus	polychromatus	Jasper	4	0.0%	0	0	0	0	0.0%	0	0	0	0	4
Cambarus	Tubericambarus	polychromatus	Jay	70	24.3%	17	4	10	3	75.7%	53	4	0	49	0
Cambarus	Tubericambarus	polychromatus	Jefferson	12	8.3%	1	0	1	0	91.7%	11	11	0	0	0
Cambarus	Tubericambarus	polychromatus	Jennings	11	36.4%	4	1	3	0	63.6%	7	7	0	0	0

Table B-8. Sex ratios of primary burrowing crayfish in Indiana by county.

Cambarus	Tubericambarus	polychromatus	Johnson	19	26.3%	5	0	5	0	73.7%	14	14	0	0	0
Cambarus	Tubericambarus	polychromatus	Knox	65	49.2%	32	11	7	14	52.3%	34	21	1	12	0
Cambarus	Tubericambarus	polychromatus	Kosciusko	13	69.2%	9	4	5	0	30.8%	4	4	0	0	0
Cambarus	Tubericambarus	polychromatus	Lagrange	1	0.0%	0	0	0	0	100.0%	1	1	0	0	0
Cambarus	Tubericambarus	polychromatus	Laporte	1	0.0%	0	0	0	0	100.0%	1	1	0	0	0
Cambarus	Tubericambarus	polychromatus	Lawrence	10	60.0%	6	0	6	0	40.0%	4	4	0	0	0
Cambarus	Tubericambarus	polychromatus	Madison	29	48.3%	14	0	9	5	51.7%	15	7	0	8	0
Cambarus	Tubericambarus	polychromatus	Marion	3	66.7%	2	0	2	0	33.3%	1	1	0	0	0
Cambarus	Tubericambarus	polychromatus	Marshall	26	46.2%	12	4	5	3	53.8%	14	10	0	4	0
Cambarus	Tubericambarus	polychromatus	Martin	68	30.9%	21	1	6	14	63.2%	43	29	0	14	0
Cambarus	Tubericambarus	polychromatus	Miami	37	56.8%	21	0	16	5	43.2%	16	12	0	4	0
Cambarus	Tubericambarus	polychromatus	Monroe	41	34.1%	14	5	8	1	39.0%	16	16	0	0	0
Cambarus	Tubericambarus	polychromatus	Montgomery	2	100.0%	2	2	0	0	0.0%	0	0	0	0	0
Cambarus	Tubericambarus	polychromatus	Morgan	9	44.4%	4	1	3	0	55.6%	5	5	0	0	0
Cambarus	Tubericambarus	polychromatus	Noble	12	16.7%	2	1	0	1	83.3%	10	9	0	1	0
Cambarus	Tubericambarus	polychromatus	Orange	27	22.2%	6	2	4	0	70.4%	19	17	2	0	0
Cambarus	Tubericambarus	polychromatus	Owen	26	38.5%	10	4	6	0	61.5%	16	12	2	2	2
Cambarus	Tubericambarus	polychromatus	Parke	43	25.6%	11	0	10	1	16.3%	7	4	0	3	25
Cambarus	Tubericambarus	polychromatus	Perry	4	25.0%	1	0	1	0	50.0%	2	2	0	0	1
Cambarus	Tubericambarus	polychromatus	Pike	66	30.3%	20	14	6	0	30.3%	20	18	2	0	9
Cambarus	Tubericambarus	polychromatus	Posey	1	0.0%	0	0	0	0	100.0%	1	0	0	1	0
Cambarus	Tubericambarus	polychromatus	Pulaski	7	28.6%	2	0	1	1	71.4%	5	0	0	5	0
Cambarus	Tubericambarus	polychromatus	Putnam	35	45.7%	16	0	7	9	54.3%	19	14	0	5	0
Cambarus	Tubericambarus	polychromatus	Randolph	19	57.9%	11	0	6	5	42.1%	8	6	0	2	0
Cambarus	Tubericambarus	polychromatus	Ripley	98	27.6%	27	4	22	1	43.9%	43	40	1	3	25
Cambarus	Tubericambarus	polychromatus	Scott	6	0.0%	0	0	0	0	83.3%	5	3	2	0	1
Cambarus	Tubericambarus	polychromatus	Spencer	11	54.5%	6	5	1	0	36.4%	4	4	0	0	1
Cambarus	Tubericambarus	polychromatus	St Joseph	2	0.0%	0	0	0	0	100.0%	2	2	0	0	0
Cambarus	Tubericambarus	polychromatus	Starke	16	56.3%	9	0	9	0	43.8%	7	7	0	0	0
Cambarus	Tubericambarus	polychromatus	Steuben	1	0.0%	0	0	0	0	100.0%	1	1	0	0	0
Cambarus	Tubericambarus	polychromatus	Sullivan	68	27.9%	19	8	10	4	67.6%	46	30	4	12	3
Cambarus	Tubericambarus	polychromatus	Switzerland	4											
Cambarus	Tubericambarus	polychromatus	Tippecanoe	19	21.1%	4	0	3	1	68.4%	13	12	0	1	1
Cambarus	Tubericambarus	polychromatus	Tipton	22	40.9%	9	0	7	2	59.1%	13	10	0	3	0
Cambarus	Tubericambarus	polychromatus	Vermillion	53	22.6%	12	1	11	0	24.5%	13	13	0	0	28
Cambarus	Tubericambarus	polychromatus	Vigo	57	22.8%	13	10	3	0	68.4%	39	36	3	0	7
Cambarus	Tubericambarus	polychromatus	Wabash	35	60.0%	21	2	17	2	40.0%	14	8	0	6	0
Cambarus	Tubericambarus	polychromatus	Warren	84	19.0%	16	0	7	9	14.3%	12	7	0	5	56
Cambarus	Tubericambarus	polychromatus	Warrick	1	100.0%	1	0	1	0	0.0%	0	0	0	0	0
Cambarus	Tubericambarus	polychromatus	Washington	8	75.0%	6	3	3	0	25.0%	2	2	0	0	0
Cambarus	Tubericambarus	polychromatus	Wayne	32	31.3%	10	0	8	2	68.8%	22	13	0	9	0
Cambarus	Tubericambarus	polychromatus	Wells	14	35.7%	5	1	3	1	64.3%	9	7	1	1	0
Cambarus	Tubericambarus	polychromatus	White	10	20.0%	2	0	0	2	80.0%	8	5	0	3	0
Cambarus	Tubericambarus	polychromatus	Whitley	30	56.7%	17	0	12	5	40.0%	12	10	1	1	1
Fallicambarus	Creaserinus	fodiens	Clay	6	0.0%	0	0	0	0	100.0%	6	6	0	0	0

Table B-8. Sex ratios of primary burrowing crayfish in Indiana by county.

Fallicambarus	Creaserinus	fodiens	Gibson	1	0.0%	0	0	0	0	0.0%	0	0	0	0	0
Fallicambarus	Creaserinus	fodiens	Greene	31	29.0%	9	2	6	1	67.7%	21	13	0	8	0
Fallicambarus	Creaserinus	fodiens	Henry	1	100.0%	1	1	0	0	0.0%	0	0	0	0	0
Fallicambarus	Creaserinus	fodiens	Knox	1	0.0%	0	0	0	0	100.0%	1	1	0	0	0
Fallicambarus	Creaserinus	fodiens	Lake	9	11.1%	1	1	0	0	88.9%	8	8	0	0	0
Fallicambarus	Creaserinus	fodiens	Madison	2	50.0%	1	0	1	0	50.0%	1	1	0	0	0
Fallicambarus	Creaserinus	fodiens	Miami	1	0.0%	0	0	0	0	100.0%	1	1	0	0	0
Fallicambarus	Creaserinus	fodiens	Monroe	48	47.9%	23	16	7	0	50.0%	24	22	2	0	1
Fallicambarus	Creaserinus	fodiens	Owen	5	0.0%	0	0	0	0	20.0%	1	1	0	0	4
Fallicambarus	Creaserinus	fodiens	Pike	15	20.0%	3	2	1	0	60.0%	9	7	2	0	0
Fallicambarus	Creaserinus	fodiens	Porter	1	0.0%	0	0	0	0	100.0%	1	1	0	0	0
Fallicambarus	Creaserinus	fodiens	Randolph	3	66.7%	2	0	2	0	33.3%	1	1	0	0	0
Fallicambarus	Creaserinus	fodiens	Spencer	7	14.3%	1	1	0	0	71.4%	5	4	0	1	1
Fallicambarus	Creaserinus	fodiens	Sullivan	32	9.4%	3	1	1	1	34.4%	11	8	0	3	18
Fallicambarus	Creaserinus	fodiens	Vigo	4	25.0%	1	1	0	0	75.0%	3	3	0	0	0
Fallicambarus	Creaserinus	fodiens	Wells	1	100.0%	1	0	1	0	0.0%	0	0	0	0	0
Fallicambarus	Creaserinus	fodiens	Whitley	11	63.6%	7	3	3	1	36.4%	4	4	0	0	0
Procambarus	Girardiella	gracilis	Fountain	1	100.0%	1	1	0	0	0.0%	0	0	0	0	0
Procambarus	Girardiella	gracilis	Jasper	9	55.6%	5	0	5	0	44.4%	4	4	0	0	0
Procambarus	Girardiella	gracilis	Knox	4	0.0%	0	0	0	0	75.0%	3	3	0	0	0
Procambarus	Girardiella	gracilis	Lake	42	2.4%	1	1	0	0	11.9%	5	5	0	0	34
Procambarus	Girardiella	gracilis	Porter	8	62.5%	5	3	2	0	37.5%	3	3	0	0	0
Procambarus	Girardiella	gracilis	Sullivan	1											
Procambarus	Girardiella	gracilis	Warren	1	100.0%	1	0	1	0	0.0%	0	0	0	0	0

Table B-9. *Cambarus polychromatus* sex (0=female; 1=male), burrow diameter (mm) and postorbital carapace length (POCL).

Species	Sex	Burrow Diameter	POCL
Cambarus polychromatus	0	39	49.0
Cambarus polychromatus	0	30	31.0
Cambarus polychromatus	0	19	21.0
Cambarus polychromatus	0	33	35.0
Cambarus polychromatus	0	33	37.0
Cambarus polychromatus	0	30	40.0
Cambarus polychromatus	0	33	45.0
Cambarus polychromatus	1	22	24.0
Cambarus polychromatus	1	20	26.0
Cambarus polychromatus	1	14	29.0
Cambarus polychromatus	1	25	29.0
Cambarus polychromatus	1	29	34.0
Cambarus polychromatus	1	28	35.0
Cambarus polychromatus	1	29	37.0
Cambarus polychromatus	1	38	40.0
Cambarus polychromatus	1	38	40.0
Cambarus polychromatus	1	37	45.0
Cambarus polychromatus	1	40	50.0
Cambarus polychromatus	0	35	47.0
Cambarus polychromatus	0	25	32.0
Cambarus polychromatus	1	12	22.0
Cambarus polychromatus	1	25	42.0
Cambarus polychromatus	1	25	33.0
Cambarus polychromatus	1	35	43.0
Cambarus polychromatus	1	40	33.0
Cambarus polychromatus	1	40	40.0
Cambarus polychromatus	1	40	38.0
Cambarus polychromatus	1	50	37.0
Cambarus polychromatus	1	45	48.0
Cambarus polychromatus	1	45	49.0
Cambarus polychromatus	1	60	56.0
Cambarus polychromatus	0	25	25.8
Cambarus polychromatus	0	40	36.3
Cambarus polychromatus	1	45	47.1
Cambarus polychromatus	1	40	37.0
Cambarus polychromatus	1	40	36.9
Cambarus polychromatus	0	40	32.7
Cambarus polychromatus	0	25	25.6

Table B-10. *Cambarus diogenes* sex (0=female; 1=male), burrow diameter (mm) and postorbital carapace length (POCL).

Species	Sex	BurDiam	POCL
Cambarus diogenes	0	40.0	49.0
Cambarus diogenes	0	20.0	18.0
Cambarus diogenes	0	26.0	20.0
Cambarus diogenes	0	27.0	20.0
Cambarus diogenes	0	25.0	21.0
Cambarus diogenes	0	25.0	22.0
Cambarus diogenes	0	27.0	22.0
Cambarus diogenes	0	28.5	22.0
Cambarus diogenes	0	29.0	24.0
Cambarus diogenes	0	23.0	27.0
Cambarus diogenes	0	32.0	29.0
Cambarus diogenes	0	32.5	28.0
Cambarus diogenes	0	33.0	30.0
Cambarus diogenes	0	39.0	34.0
Cambarus diogenes	0	38.0	38.0
Cambarus diogenes	1	17.0	15.0
Cambarus diogenes	1	18.0	18.0
Cambarus diogenes	1	27.0	20.0
Cambarus diogenes	1	33.0	22.0
Cambarus diogenes	1	31.0	24.0
Cambarus diogenes	1	32.0	24.0
Cambarus diogenes	1	28.0	25.0
Cambarus diogenes	1	37.0	32.0
Cambarus diogenes	1	50.0	37.0
Cambarus diogenes	1	50.0	38.0
Cambarus diogenes	0	40.0	41.0
Cambarus diogenes	0	40.0	39.0
Cambarus diogenes	0	45.0	31.0
Cambarus diogenes	0	40.0	38.0
Cambarus diogenes	1	40.0	41.0
Cambarus diogenes	0	50.0	40.0
Cambarus diogenes	0	30.0	45.0
Cambarus diogenes	0	40.0	32.0
Cambarus diogenes	1	50.0	28.0
Cambarus diogenes	0	75.0	56.0
Cambarus diogenes	0	45.0	55.2
Cambarus diogenes	0	35.0	39.8
Cambarus diogenes	0	30.0	26.7
Cambarus diogenes	0	28.0	34.7
Cambarus diogenes	1	50.0	57.6
Cambarus diogenes	1	21.0	28.2
Cambarus diogenes	0	50.0	44.3
Cambarus diogenes	1	31.0	40.7
Cambarus diogenes	0	60.0	55.9
Cambarus diogenes	0	45.0	59.4
Cambarus diogenes	1	55.0	53.4
Cambarus diogenes	0	30.0	46.4

Table B-10 , continued.

Cambarus diogenes	0	60.0	57.8
Cambarus diogenes	0	60.0	56.7
Cambarus diogenes	1	40.0	42.0
Cambarus diogenes	1	45.0	32.0
Cambarus diogenes	1	75.0	57.0

Table B-11. *Fallicambarus fodiens* sex (0=female; 1=male), burrow diameter (mm) and postorbital carapace length (POCL).

Species	Sex	BurDiam	POCL
Fallicambarus fodiens	0	18.75	18.6
Fallicambarus fodiens	0	20	18.9
Fallicambarus fodiens	0	48	19.3
Fallicambarus fodiens	0	18	20.0
Fallicambarus fodiens	0	18	20.0
Fallicambarus fodiens	0	12	20.6
Fallicambarus fodiens	0	21.9	22.1
Fallicambarus fodiens	0	22	22.2
Fallicambarus fodiens	0	35	25.5
Fallicambarus fodiens	0	18	26.0
Fallicambarus fodiens	0	25	26.0
Fallicambarus fodiens	0	20	26.5
Fallicambarus fodiens	0	20	26.5
Fallicambarus fodiens	0	25	27.8
Fallicambarus fodiens	0	27	29.1
Fallicambarus fodiens	0	27	29.1
Fallicambarus fodiens	0	25	29.2
Fallicambarus fodiens	0	30	29.3
Fallicambarus fodiens	0	28	29.3
Fallicambarus fodiens	0	45	30.3
Fallicambarus fodiens	0	25	31.0
Fallicambarus fodiens	0	25	31.0
Fallicambarus fodiens	0	25	31.7
Fallicambarus fodiens	0	40	32.0
Fallicambarus fodiens	0	15	33.0
Fallicambarus fodiens	0	15	33.0
Fallicambarus fodiens	0	32	33.6
Fallicambarus fodiens	0	35	34.0
Fallicambarus fodiens	0	22	34.4
Fallicambarus fodiens	0	35	34.4
Fallicambarus fodiens	0	28	34.7
Fallicambarus fodiens	0	50	35.0
Fallicambarus fodiens	0	35	35.0
Fallicambarus fodiens	0	35	35.0
Fallicambarus fodiens	0	25	36.8
Fallicambarus fodiens	0	25	36.8
Fallicambarus fodiens	0	40	37.0
Fallicambarus fodiens	0	50	38.0

Table B-11 , continued.

Species	Sex	BurDiam	POCL
Fallicambarus fodiens	0	50	40.5
Fallicambarus fodiens	0	45	41.0
Fallicambarus fodiens	0	35	42.0
Fallicambarus fodiens	0	36	42.0
Fallicambarus fodiens	0	45	42.0
Fallicambarus fodiens	0	40	42.0
Fallicambarus fodiens	0	60	56.2
Fallicambarus fodiens	1	15.6	16.0
Fallicambarus fodiens	1	21.9	19.8
Fallicambarus fodiens	1	18	20.1
Fallicambarus fodiens	1	25	21.4
Fallicambarus fodiens	1	22	21.6
Fallicambarus fodiens	1	20	22.6
Fallicambarus fodiens	1	25	23.0
Fallicambarus fodiens	1	25	24.0
Fallicambarus fodiens	1	21.9	24.1
Fallicambarus fodiens	1	30	24.1
Fallicambarus fodiens	1	25	24.9
Fallicambarus fodiens	1	25	30.6
Fallicambarus fodiens	1	24	30.7
Fallicambarus fodiens	1	40	32.9
Fallicambarus fodiens	1	40	34.0
Fallicambarus fodiens	1	35	35.0
Fallicambarus fodiens	1	40	38.0
Fallicambarus fodiens	1	45	38.0
Fallicambarus fodiens	1	38	38.9
Fallicambarus fodiens	1	60	40.0
Fallicambarus fodiens	1	40	41.0
Fallicambarus fodiens	1	45	41.0
Fallicambarus fodiens	1	50	41.0
Fallicambarus fodiens	1	50	41.0
Fallicambarus fodiens	1	40	43.0
Fallicambarus fodiens	1	60	46.0

Table B-12. *Cambarus polychromatus* —Biometry data.

Date	Sex	Total Length (mm)	Posterior Orbital Ridge-Carapace Length (mm)	Carapace Length (mm)	Abdomen Width (mm)	Carapace Width (mm)
7/20/2004	F	51.0	20.5	26.0	9.0	11.2
7/20/2004	M2	48.3	19.8	24.2	8.9	10.6
7/20/2004	M2	68.7	29.0	35.1	12.6	15.4
7/20/2004	F	77.9	31.9	38.9	14.7	17.4
7/27/2004	JUV	38.1	18.9	19.4	7.5	8.3
7/27/2004	JUV	82.8	33.8	40.4	20.1	20.0
7/27/2004	JUV	15.6	6.6	8.5	3.3	3.9
7/27/2004	JUV	23.2	8.6	11.8	4.2	5.4
7/27/2004	JUV	14.4	5.9	7.9	3.1	4.2
7/27/2004	JUV	40.0	16.2	20.0	7.9	8.9
7/27/2004	JUV	43.1	17.7	22.4	8.0	9.5
7/27/2004	JUV	40.2	16.7	20.8	7.6	9.4
7/27/2004	F	55.2	21.6	27.0	10.9	12.9
7/27/2004	JUV	12.2	4.0	6.2	2.1	2.6
7/27/2004	JUV	38.2	16.5	19.3	7.3	8.3
7/28/2004	JUV	27.1	10.1	12.7	4.8	6.4
7/28/2004	JUV	25.3	9.8	12.6	5.1	5.6
7/28/2004	JUV	31.3	15.8	13.1	5.9	6.9
7/28/2004	JUV	26.3	10.9	13.2	4.8	6.1
7/28/2004	F	58.3	24.7	29.2	11.4	12.8
7/28/2004	JUV	25.3	10.0	13.3	5.1	6.2
7/28/2004	JUV	26.1	10.3	12.9	4.7	5.9
7/28/2004	F	39.5	15.7	18.9	7.7	8.9
7/28/2004	JUV	26.5	10.4	13.1	4.8	6.1
7/28/2004	JUV	28.5	11.2	13.6	4.9	6.2
7/28/2004	JUV	29.7	11.7	14.7	5.4	6.8
7/28/2004	M2	69.0	30.9	36.6	13.9	17.6
7/28/2004	JUV	25.6	10.1	14.4	4.9	5.8
7/28/2004	JUV	45.8	19.0	22.5	9.0	10.7
7/28/2004	JUV	27.2	11.0	13.7	5.3	6.0
7/28/2004	JUV	29.6	12.2	14.9	5.2	6.4
7/28/2004	M2	71.9	31.4	37.3	13.6	16.4
8/3/2004	M2	42.7	16.7	20.7	7.9	8.8
8/3/2004	M2	46.4	19.0	22.5	9.0	10.0
8/3/2004	F	97.2	38.1	45.7	22.1	21.0
8/3/2004	JUV	22.6	8.8	11.0	4.2	4.9
8/3/2004	JUV	20.0	7.5	9.8		4.2
8/3/2004	JUV	21.8	7.8	10.3	3.8	3.8
8/3/2004	M2	47.9	19.9	23.7	8.5	10.5
8/3/2004	M2	42.7	17.6	21.2	8.0	9.3
8/3/2004	JUV	20.4	7.8	9.5	3.9	4.3
8/5/2004	M2	62.9	26.1	30.9	11.4	13.6
8/5/2004	JUV	22.2	8.4	10.6	4.3	4.9
8/5/2004	JUV	24.1	9.9	11.7	4.4	5.4
8/5/2004	M2	76.0	32.7	38.6	14.5	17.4
8/5/2004	F	79.6	31.6	38.5	15.8	17.4
8/5/2004	JUV	23.9	8.5	11.3	4.4	5.2
8/5/2004	M2	43.0	17.4	21.2	8.4	9.4

Table B-12. *Cambarus polychromatus* —Biometry data.

Date	Sex	Total Length (mm)	Posterior Orbital Ridge-Carapace Length (mm)	Carapace Length (mm)	Abdomen Width (mm)	Carapace Width (mm)
8/5/2004	F	86.2	34.1	41.6	18.8	18.2
8/5/2004	M2	54.9	22.6	26.9	10.4	12.2
8/5/2004	F	74.4	30.1	35.4	16.8	16.2
8/5/2004	F	37.6	15.1	18.0	7.5	8.0
8/5/2004	M2	98.8	41.1	49.9	18.9	22.3
8/6/2004	M1	92.3	39.1	45.7	17.5	21.9
8/6/2004	F	89.2	34.6	41.6	20.8	18.2
8/6/2004	M2	70.0	28.5	34.0	13.0	14.8
8/6/2004	M1	78.6	33.2	39.9	14.6	17.6
8/6/2004	F	51.7	20.7	25.2	9.8	11.5
8/6/2004	M2	74.6	30.9	37.3	14.3	16.8
8/6/2004	M2	48.2	18.9	2.7	8.9	10.6
8/6/2004	M2	51.8	21.0	25.3	9.6	11.4
8/6/2004	M2	55.5	22.2	26.8	10.0	12.5
8/6/2004	M2	86.7	36.8	43.6	16.6	19.9
8/6/2004	M2	63.8	25.3	30.9	12.2	14.4
8/6/2004	F	75.4	3.8	37.0	15.1	16.3
8/9/2004	F	69.5	28.2	33.8	12.5	15.3
8/9/2004	F	43.1	16.9	20.7	7.9	8.9
8/9/2004	M2	76.1	33.4	39.9	14.4	17.3
8/9/2004	F	42.5	17.3	20.8	8.4	10.2
8/9/2004	F	83.6	32.5	39.3	19.4	18.6
8/9/2004	F	89.6	36.1	43.0	20.0	18.6
8/9/2004	F	82.6	33.1	40.2	15.4	17.5
8/10/2004	JUV	32.8	13.9	15.2	6.4	7.4
8/10/2004	JUV	38.7	16.3	19.0	7.7	9.2
8/10/2004	JUV	27.1	10.1	12.6	5.6	4.6
8/10/2004	JUV	37.6	15.6	18.2	7.2	8.6
8/10/2004	JUV	23.3	9.3	10.7	3.9	4.8
8/10/2004	JUV	34.5	13.5	16.3	7.0	7.9
8/10/2004	M2	69.3	29.4	34.5	12.9	16.5
8/10/2004	F	60.1	24.9	28.5	10.8	12.9
8/10/2004	F	60.1	24.9	28.5	10.8	12.9
8/10/2004	JUV	28.7	12.2	14.2	4.5	6.5
8/10/2004	JUV	24.3	9.7	11.7	4.7	5.1
8/12/2004	JUV	25.6	10.3	12.7	5.1	5.7
8/12/2004	F	54.4	22.0	26.4	10.2	12.1
8/12/2004	F	92.4	36.5	43.9	21.4	20.7
8/12/2004	F	54.1	21.4	26.0	9.9	11.4
8/13/2004	F	51.3	21.0	25.0	9.8	11.4
8/13/2004	JUV	34.6	14.2	17.2	6.3	7.8
8/13/2004	JUV	28.5	11.6	14.0	5.2	6.3
8/13/2004	JUV	27.4	13.4	11.0	5.4	6.1
8/13/2004	M1	71.7	30.6	35.9	13.5	16.1
8/13/2004	JUV	28.0	11.2	13.5	4.9	6.3
3/29/2005	M2	51.4	21.1	26.1	9.4	11.8
3/29/2005	F	103.1	40.4	48.8	23.1	23.1
3/29/2005	M1	113.1	47.8	58.0	20.4	28.0

Table B-12. *Cambarus polychromatus* —Biometry data.

Date	Sex	Total Length (mm)	Posterior Orbital Ridge-Carapace Length (mm)	Carapace Length (mm)	Abdomen Width (mm)	Carapace Width (mm)
4/9/2005	F	97.9	39.8	48.7	18.1	21.4
4/9/2005	M2	75.2	30.9	37.5	14.3	16.9
4/9/2005	F	83.0	32.1	39.6	15.9	18.1
4/19/2005	M2	52.6	21.6	26.8	9.4	11.8
4/19/2005	M2	75.0	30.8	37.8	13.8	17.3
4/19/2005	F	75.5	29.6	36.1	14.5	16.7
4/19/2005	F	72.9	29.2	35.6	13.9	16.0
4/19/2005	M2	81.1	31.7	39.3	15.3	17.6
4/19/2005	M2	66.6	27.0	32.9	12.0	14.4
4/19/2005	NR		46.4	54.7		26.1
5/11/2005	OVIG	117.7	45.9	55.3	26.7	26.7
5/11/2005	F	56.8	22.7	27.6	10.9	12.3
5/11/2005	JUV	28.1	11.6	14.3	4.7	5.7
5/11/2005	F	98.0	38.0	46.2	21.7	20.7
5/11/2005	JUV	34.6	13.0	16.9	6.4	7.3
5/11/2005	JUV	30.7	11.1	15.0	5.2	6.3
5/11/2005	JUV	24.3	9.2	11.6	4.3	5.1
5/11/2005	JUV	22.0	8.7	11.4	4.0	4.7
5/11/2005	F	91.4	35.5	43.3	20.7	19.6
5/11/2005	JUV	29.7	12.1	15.3	5.3	6.8
5/11/2005	F	101.2	39.0	46.9	23.5	22.5
5/11/2005	M2	61.2	25.2	30.5	11.4	14.5
5/11/2005	JUV-F	29.5	11.4	14.1	5.8	5.9
5/11/2005	F	70.8	29.6	34.7	14.1	17.4
5/11/2005	F	98.0	38.9	45.6	22.0	21.0
5/11/2005	JUV	30.6	12.8	15.1	5.5	6.1
5/12/2005	F	104.0	42.2	50.3	23.6	21.7
5/12/2005	M1	89.7	39.8	47.4	17.4	21.6
5/17/2005	M1	84.6	36.3	43.5	16.0	19.7
5/17/2005	JUV	34.7	14.3	17.7	6.7	7.7
5/17/2005	JUV	27.3	10.7	14.2	4.7	5.3
5/17/2005	JUV	37.7	16.5	20.2	6.1	7.9
5/17/2005	OVIG	100.4	41.0	49.1	22.6	21.3
5/18/2005	JUV	28.9	11.1	14.1	5.2	6.2
5/18/2005	F	81.9	33.5	40.1	15.9	18.1
5/18/2005	M2	78.4	32.0	39.9	14.4	16.7
5/19/2005	JUV	30.9	11.7	15.1	5.8	6.7
5/19/2005	F	57.1	22.5	27.4	10.4	11.6
5/19/2005	JUV	25.6	10.5	12.9	4.9	5.7
5/19/2005	JUV	28.3	11.5	14.0	5.0	6.2
5/19/2005	F	56.0	23.1	27.5	11.1	12.3
5/19/2005	F	102.2	40.0	47.9	23.7	21.8
5/19/2005	F	45.0	18.5	22.6	9.0	9.6
5/23/2005	F	88.9	35.1	43.2	16.8	18.9
5/23/2005	F	105.6	44.8	53.1	24.6	24.9
5/23/2005	JUV	32.2	12.4	15.2	5.3	7.7
5/23/2005	M1	88.3	37.2	44.8	16.5	20.8
5/23/2005	F	75.6	30.1	36.6	16.3	15.6

Table B-12. *Cambarus polychromatus* —Biometry data.

Date	Sex	Total Length (mm)	Posterior Orbital Ridge-Carapace Length (mm)	Carapace Length (mm)	Abdomen Width (mm)	Carapace Width (mm)
5/23/2005	JUV	13.8	5.9	7.8	1.9	2.8
5/24/2005	M1	70.3	28.2	35.1	13.3	15.2
5/26/2005	M2	50.9	20.8	25.6	9.6	11.4
6/2/2005	F	110.4	44.0	51.7	25.0	24.4
6/2/2005	F	73.8	30.0	36.6	14.5	15.5
6/2/2005	F	38.8	15.4	19.3	6.9	8.3
6/2/2005	JUV	10.0	4.0	5.5	1.6	2.3
6/13/2005	JUV	33.1	12.9	15.3	6.1	7.3
6/13/2005	JUV	27.7	10.8	13.8	4.9	6.1
6/13/2005	JUV	31.3	12.5	15.6	5.5	7.1
6/13/2005	JUV	28.0	11.4	13.6	5.3	6.1
6/13/2005	JUV	32.0	12.2	15.6	5.9	6.9
6/13/2005	M2	67.9	28.3	34.6	12.6	14.7
6/13/2005	M2	78.5	32.8	39.6	14.3	17.6
6/13/2005	F	52.9	21.6	26.3	10.1	11.5
6/13/2005	F	92.2	35.7	44.0	20.5	19.6
6/13/2005	F	56.0	22.3	27.2	10.5	12.1
6/13/2005	JUV	33.3	12.8	16.5	6.3	7.3
6/13/2005	F	93.5	36.1	44.3	22.0	19.9
6/13/2005	JUV	28.9	11.0	13.2	5.0	6.3
6/13/2005	JUV	32.9	13.5	16.2	6.0	7.3
6/13/2005	F	97.6	39.9	48.0	19.6	22.0
6/13/2005	JUV					
6/13/2005	F	98.8	39.9	48.0	22.9	22.6
6/13/2005	F	110.0	43.0	51.6	25.8	23.1
6/13/2005	M1	98.1	42.5	50.2	18.7	22.7
6/13/2005	JUV	31.7	12.5	14.9	5.6	6.5
6/14/2005	M2	77.1	31.0	37.6	13.9	16.4
6/14/2005	M2	90.1	37.6	46.1	16.8	20.6
6/14/2005	F	66.8	26.2	31.7	12.3	14.1
6/14/2005	M2	62.3	25.2	31.4	11.3	12.7
6/16/2005	JUV	33.1	12.7	15.7	5.5	6.8
6/16/2005	F	65.4	26.8	31.7	12.2	14.3
6/16/2005	JUV	32.5	12.9	16.2	6.0	7.0
6/16/2005	F	73.2	29.1	35.2	13.8	15.5
6/16/2005	F	47.9	19.1	23.3	9.3	10.9
6/16/2005	F	58.9	23.5	28.7	10.8	13.1
6/16/2005	M2	52.6	21.9	25.7	10.0	11.3
6/16/2005	M2	62.4	25.5	31.2	11.5	13.6
6/16/2005	M2	59.1	23.5	28.8	11.0	12.4
6/16/2005	M2	70.5	27.9	34.4	12.5	15.0
6/16/2005	M2	80.7	32.8	37.8	14.8	17.5
6/16/2005	JUV	29.2	11.0	13.9	4.8	6.3
6/16/2005	JUV	30.7	11.5	14.3	5.7	6.5
6/16/2005	M2	64.3	26.3	32.0	11.9	14.8
6/16/2005	F	79.6	31.5	38.1	15.2	17.1
6/16/2005	M2	86.6	34.3	42.0	16.8	19.9
6/16/2005	M1	89.0	36.7	44.6	15.9	21.2

Table B-12. *Cambarus polychromatus* —Biometry data.

Date	Sex	Total Length (mm)	Posterior Orbital Ridge-Carapace Length (mm)	Carapace Length (mm)	Abdomen Width (mm)	Carapace Width (mm)
6/16/2005	NR		35.7	42.6		19.8
6/16/2005	F	80.9	31.6	39.1	15.3	17.1
6/16/2005	JUV	29.0	11.3	13.8	5.0	6.4
6/16/2005	M2	65.4	26.6	32.4	11.7	14.6
6/16/2005	M2	49.0	19.4	24.0	8.8	10.9
6/16/2005	JUV	32.8	11.8	15.2	5.0	7.7
6/16/2005	F	66.2	27.1	33.0	12.8	14.8
6/17/2005	M1	84.3	35.2	41.9	15.9	19.7
6/17/2005	M2	64.5	26.0	31.6	11.8	14.5
6/17/2005	M1	70.2	29.1	35.5	13.1	16.1
6/17/2005	M1	88.2	37.1	44.5	16.0	21.0
6/17/2005	M2	94.5	39.9	48.4	17.0	23.0
6/17/2005	M2	76.4	31.6	37.1	14.5	17.8
6/22/2005	M2	96.0	40.9	49.0	18.9	22.3
6/28/2005	F	66.8	26.4	32.4	12.4	14.4
6/28/2005	F	36.5	14.2	17.1	6.5	7.9
6/29/2005	JUV	42.5	17.1	20.8	7.8	9.5
6/29/2005	JUV	34.0	12.5	16.5	5.9	7.5
6/30/2005	F	104.0	41.0	49.6	23.1	23.1
6/30/2005	JUV	20.8	7.5	10.1	3.7	4.6
6/30/2005	JUV	18.4	7.2	9.2	3.5	4.0
6/30/2005	JUV	19.2	7.3	9.7	3.1	4.0
6/30/2005	JUV	16.7	6.6	8.5	2.9	3.5
6/30/2005	JUV	19.4	7.0	9.8	3.3	4.2
6/30/2005	JUV	17.0	6.1	8.5	3.0	3.7
6/30/2005	JUV	19.3	7.1	9.6	2.6	3.9
6/30/2005	JUV	19.9	7.2	9.8	3.2	4.1
6/30/2005	M2	68.8	27.8	33.9	12.3	15.6
6/30/2005	JUV	20.2	8.5	10.6	4.1	4.5
6/30/2005	JUV	19.8	7.8	10.2	3.2	4.3
6/30/2005	JUV	20.3	6.7	9.5	3.3	4.3
6/30/2005	JUV	18.3	7.1	9.3	3.2	3.9
6/30/2005	JUV	18.7	6.8	9.2	3.0	3.8
6/30/2005	JUV	15.0	5.9	7.3	2.3	2.8
6/30/2005	JUV	19.9	7.1	9.8	3.4	4.4
6/30/2005	JUV	19.1	7.5	9.9	3.2	4.4
6/30/2005	JUV	20.0	7.8	10.1	3.6	4.6
6/30/2005	JUV	18.4	7.5	8.5	3.2	4.1
6/30/2005	JUV	20.1	7.8	10.1	3.2	4.7
6/30/2005	JUV	19.5	7.3	9.7	3.7	4.3
6/30/2005	JUV	19.9	7.0	9.3	3.3	4.4
6/30/2005	JUV	19.0	7.6	9.3	2.6	3.7
6/30/2005	JUV	17.6	7.2	9.0	2.7	3.9
6/30/2005	JUV	21.1	8.3	10.8	4.1	4.5
6/30/2005	JUV	19.0	7.2	9.2	3.3	4.1
6/30/2005	JUV	18.9	6.7	8.9	2.9	3.7
6/30/2005	F	112.4	44.0	52.9	25.3	24.5
6/30/2005	F	57.3	22.7	27.7	10.5	12.3

Table B-12. *Cambarus polychromatus* —Biometry data.

Date	Sex	Total Length (mm)	Posterior Orbital Ridge-Carapace Length (mm)	Carapace Length (mm)	Abdomen Width (mm)	Carapace Width (mm)
6/30/2005	M2	93.1	38.3	46.7	17.1	21.5
6/30/2005	F	100.9	39.2	47.7	23.7	21.1
6/30/2005	F	105.0	41.2	49.7	23.0	23.5
6/30/2005	JUV	18.8	7.2	9.1	3.1	4.0
6/30/2005	JUV	17.7	6.7	8.8	2.2	3.1
6/30/2005	JUV	18.4	6.6	8.9	3.6	4.0
6/30/2005	JUV	20.5	7.8	10.3	3.2	4.4
6/30/2005	JUV	21.1	8.0	10.9	3.7	4.6
6/30/2005	JUV	20.1	7.4	9.5	2.9	3.9
6/30/2005	JUV	20.8	8.0	9.9	3.3	4.0
7/1/2005	F	93.9	35.9	44.0	20.3	20.3
7/1/2005	F	112.1	43.3	52.8	25.1	23.2
7/7/2005	JUV	17.8	6.2	8.8	3.0	4.1
7/7/2005	JUV	19.5			3.4	
7/7/2005	F	96.2	38.2	45.6	17.4	20.9
7/26/2005	F	67.0	26.8	32.0	13.4	14.3
7/26/2005	M2	75.5	30.7	37.6	13.9	17.3
7/26/2005	M2	44.4	17.7	21.8	7.9	9.6
7/26/2005	JUV	24.5	9.6	11.8	4.6	5.4
7/26/2005	M2	45.4	18.7	23.0	8.6	9.7
7/26/2005	F	69.3	27.7	33.3	13.3	14.8
7/26/2005	F	63.1	24.3	30.6	12.2	13.5
7/27/2005	JUV	22.2	8.7	10.7	4.1	4.6
7/27/2005	JUV	29.1	11.3	14.4	5.2	6.3
7/27/2005	JUV	27.1	10.9	13.4	5.1	6.0
7/27/2005	JUV	23.5	9.0	11.3	3.8	5.3
7/27/2005	F	41.0	16.6	19.8	7.7	9.1
7/27/2005	F	42.6	16.8	20.4	7.8	9.3
7/27/2005	M2	61.4	25.5	30.5	11.7	13.8
7/27/2005	JUV	25.9	9.3	12.6	4.8	6.0
7/27/2005	JUV	39.3	16.2	19.3	7.0	8.8
7/28/2005	F	67.7	27.3	33.4	12.9	14.6
7/28/2005	JUV	27.3	10.7	14.2	5.3	5.9
7/28/2005	F	57.4	22.7	27.5	10.6	12.7
7/28/2005	M2	50.9	20.4	24.7	9.5	11.2
7/28/2005	JUV	20.4	7.8	10.5	3.6	4.5
7/28/2005	JUV	25.0	9.7	12.5	4.2	5.2
7/28/2005	JUV	26.8	10.6	13.4	5.0	6.0
7/29/2005	F	44.5	17.6	21.9	8.3	9.5
7/29/2005	F	46.9	18.5	23.0	8.9	10.5
7/29/2005	F	44.2	17.5	21.4	8.2	9.9
7/29/2005	M2	45.2	18.1	22.2	8.5	10.1
8/1/2005	F	43.5	17.0	20.8	8.1	9.3
8/1/2005	F	47.8	19.2	22.6	9.2	10.5
8/1/2005	JUV	27.4	10.8	13.4	5.0	6.2
8/1/2005	F	59.9	23.5	28.3	11.4	13.1
8/1/2005	JUV	29.1	11.5	14.5	5.3	6.3
8/1/2005	F	46.4	18.4	22.6	8.5	10.0

Table B-12. *Cambarus polychromatus* —Biometry data.

Date	Sex	Total Length (mm)	Posterior Orbital Ridge-Carapace Length (mm)	Carapace Length (mm)	Abdomen Width (mm)	Carapace Width (mm)
8/2/2005	F	75.5	29.7	35.8	16.7	15.1
8/2/2005	JUV	40.8	16.2	19.9	7.4	8.6
8/2/2005	M2	72.7	30.5	37.3	13.7	15.9
8/2/2005	M2	75.0	31.2	37.2	13.8	17.0
8/2/2005	JUV	31.8	11.8	15.0	5.7	7.1
8/2/2005	JUV	30.9	11.7	15.2	5.9	6.9
8/2/2005	JUV	36.8	14.3	17.7	6.9	8.1
8/2/2005	JUV-M	44.4	17.1	21.4	8.7	9.6
8/2/2005	JUV-M	44.2	17.4	21.8	8.9	9.8
8/2/2005	M2	48.7	20.5	24.3	8.8	10.9
8/2/2005	M2	73.5	29.7	36.0	12.9	16.2
8/2/2005	M2	70.9	28.6	34.6	12.9	15.8
8/2/2005	F	88.1	34.8	41.3	16.8	17.6
8/2/2005	JUV	35.8	13.9	17.5	6.6	7.9
8/2/2005	M2	77.6	31.6	38.7	14.4	17.4
8/2/2005	F	92.0	36.0	42.9	16.6	20.6
8/2/2005	F	87.0	35.3	41.6	16.5	18.8
8/2/2005	F	81.8	31.1	38.4	15.7	18.2
8/2/2005	JUV	35.4	14.4	17.6	6.4	7.7
8/2/2005	F	84.6	33.2	40.1	16.7	18.9
8/2/2005	JUV	24.0	9.7	11.9	4.4	5.2
8/2/2005	JUV	37.6	12.5	17.4	6.8	7.5
8/2/2005	M2	61.3	24.8	30.7	11.3	14.3
8/2/2005	JUV	40.1	15.6	19.8	7.6	8.7
8/2/2005	M2	63.4	25.1	30.2	11.6	14.3
8/2/2005	M2	56.3	22.5	27.7	10.6	12.3
8/2/2005	M1	78.8	33.4	40.2	14.3	18.1
8/2/2005	F	65.0	25.9	31.4	12.5	13.8
8/2/2005	M2	78.3	31.4	37.7	14.4	17.8
8/2/2005	F	59.7	24.1	29.0	11.8	13.0
8/2/2005	F	52.5	20.8	25.6	10.1	11.1
8/3/2005	F	87.6	34.7	41.6	17.1	18.1
8/3/2005	F	85.8	33.4	40.3	18.5	18.1
8/3/2005	JUV	24.2	8.7	12.0	4.6	5.8
8/4/2005	F	57.6	22.9	28.0	11.2	12.6
8/4/2005	F	45.2	18.2	22.4	8.5	10.0
8/4/2005	F	58.8	23.4	28.4	11.4	13.4
8/4/2005	M2	52.7	22.2	26.5	9.4	12.1
8/4/2005	M1	83.5	34.6	42.0	15.6	19.4
8/4/2005	JUV	41.1	16.0	19.9	6.9	8.9
8/8/2005	M2	44.8	18.8	22.1	8.5	9.4
8/8/2005	M2	84.8	37.0	43.9	15.3	20.0
8/8/2005	M1	82.9	35.4	41.9	15.5	18.9
8/8/2005	M2	53.1	21.6	25.9	9.7	12.5
8/8/2005	F	98.3	39.2	46.9	22.8	21.7
8/8/2005	F	69.1	27.6	33.2	13.7	14.4
8/8/2005	JUV	19.4	8.0	9.4	3.5	4.2
8/8/2005	F	56.1	22.4	26.4	10.6	12.0

Table B-12. *Cambarus polychromatus* —Biometry data.

Date	Sex	Total Length (mm)	Posterior Orbital Ridge-Carapace Length (mm)	Carapace Length (mm)	Abdomen Width (mm)	Carapace Width (mm)
8/9/2005	F	44.8	17.4	21.3	8.1	9.8
8/11/2005	M2	52.6	20.8	26.1	9.8	11.6
8/11/2005	M2	51.7	20.9	25.4	9.9	10.5
8/11/2005	M2	51.7	21.4	25.6	9.6	11.7
8/11/2005	F	46.2	18.1	22.5	8.9	9.4
8/11/2005	F	47.0	18.7	22.5	8.7	10.0
8/11/2005	M2	48.6	20.3	25.3	9.2	11.2
8/11/2005	F	46.4	18.7	22.8	8.8	10.4
8/11/2005	F	51.4	20.3	24.7	10.0	11.3
8/11/2005	M2	60.1	23.6	28.9	11.2	12.6
8/11/2005	M2	44.5	16.9	21.3	8.3	9.3
8/11/2005	M2	47.7	19.6	24.1	8.9	10.2
8/11/2005	F	94.1	37.5	45.6	20.1	20.7
8/11/2005	M2	39.8	16.7	20.0	7.4	8.8
8/11/2005	F	46.8	18.2	22.4	8.9	10.7
8/11/2005	F	50.7	20.0	24.4	9.0	10.5
8/11/2005	M2	69.0	27.9	33.7	12.8	14.6
8/11/2005	F	78.2	30.9	37.3	15.6	17.1
8/11/2005	M2	82.5	33.7	40.9	15.8	17.9
8/12/2005	M2	59.8	23.0	28.2	10.9	12.9
8/12/2005	F	45.4	18.0	21.9	8.7	10.2
8/12/2005	F	95.8	38.6	45.8	22.2	20.9
8/12/2005	F	42.9	16.9	20.3	8.0	9.4
8/12/2005	M2	65.6	26.1	31.8	11.0	14.2
8/12/2005	F	44.3	17.1	20.6	8.1	9.5
8/23/2005	F	72.1	28.5	34.5	14.2	15.2
8/23/2005	F	89.0	34.7	42.4	17.5	19.1
8/23/2005	F	88.3	35.3	42.8	17.6	19.7
8/23/2005	F	68.9	28.1	34.1	13.3	15.6
8/23/2005	M2	85.7	34.6	41.9	15.5	19.3
8/23/2005	F	40.4	16.3	19.9	7.9	8.8
8/23/2005	F	64.7	25.7	31.4	12.4	14.1
8/24/2005	F	46.3	20.1	24.3	9.3	11.0
8/24/2005	F	50.4	20.2	25.3	9.7	11.5
8/24/2005	M2	85.0	36.0	43.0	15.3	19.6
8/24/2005	M2	88.3	36.4	44.6	16.8	20.0
8/24/2005	M2	76.9	32.7	39.7	13.9	17.3
8/24/2005	F	76.4	30.1	36.5	14.8	16.8
8/24/2005	M1	98.9	40.8	49.0	18.5	23.7
8/24/2005	F	93.1	38.2	44.9	19.3	20.6
8/24/2005	M1	94.4	40.9	48.3	17.2	22.9
8/24/2005	M1	80.7	34.9	41.8	15.6	19.2
8/24/2005	F	109.0	41.3	49.5	24.2	23.1
8/24/2005	F	62.3	25.8	30.0	11.9	13.3
8/24/2005	F	90.0	37.1	42.8	16.1	19.9
8/24/2005	F	85.0	35.0	40.6	16.3	18.9
8/24/2005	M2	74.0	31.6	37.3	13.1	16.8
8/24/2005	M2	72.4	30.6	36.0	13.3	16.6

Table B-12. *Cambarus polychromatus* —Biometry data.

Date	Sex	Total Length (mm)	Posterior Orbital Ridge-Carapace Length (mm)	Carapace Length (mm)	Abdomen Width (mm)	Carapace Width (mm)
8/24/2005	M1	84.7	36.4	42.5	15.6	20.4
8/24/2005	F	87.4	35.1	41.8	20.0	18.3
8/25/2005	M1	67.0	27.6	34.1	11.9	14.6
8/25/2005	F	43.3	16.7	21.0	8.5	9.6
8/25/2005	F	51.5	20.4	24.3	9.7	11.2
8/25/2005	M2	49.7	19.9	24.1	9.1	10.7
8/25/2005	JUV	29.4	11.1	14.1	5.6	6.8
8/25/2005	F	62.9	24.9	30.2	12.0	13.5
8/25/2005	F	66.6	25.9	32.9	12.8	14.5
8/25/2005	F	83.7	33.3	40.0	20.1	21.7
8/25/2005	JUV	27.3	10.5	13.1	5.4	6.0
8/25/2005	M1	67.3	28.9	35.1	12.8	15.9
8/25/2005	F	48.2	19.4	23.8	9.3	10.3
8/25/2005	M2	70.2	28.8	35.5	12.9	15.7

Table B-13. *Cambarus dogenes* —Biometry data.

Date	Sex	Total Length (mm)	Posterior Orbit Ridge-Carapace Length (mm)	Carapace Length (mm)	Abdomen Width (mm)	Carapace Width (mm)
	M1	104.00	43.90	53.00	21.00	26.50
	M1	101.4	43.8	52.0	20.3	25.0
	M1	92.1	38.3	46.6	17.6	23.4
	M2	109.0	47.3	54.9	21.0	27.8
	F	115.0	46.7	56.0	24.4	26.8
	F	45.8	18.7	22.1	8.2	10.5
5/18/2001	M1	116.0	50.7	60.3	21.7	29.2
8/8/2001	JUV	23.7	10.1	13.2	4.7	5.6
8/15/2001	JUV	26.2	11.4	14.4	5.0	6.9
8/15/2001	F	107.0	16.2	54.5	25.2	25.7
7/6/2002	M2	54.3	22.3	27.0	10.2	11.9
9/23/2003	M2	62.6	26.3	31.3	11.8	14.6
9/23/2003	F	52.4	22.1	26.0	10.5	12.5
9/23/2003	F	84.0	35.2	41.9	17.4	19.8
9/30/2003	F	77.0	32.3	38.9	14.8	17.9
3/22/2004	F	63.7	26.9	32.4	12.3	15.3
6/14/2004	F	90.6	40.0	45.9	18.6	23.2
6/15/2004	F	60.5	26.9	32.0	12.1	14.2
6/15/2004	M2	71.7	32.6	37.5	15.0	18.2
6/15/2004	M2	102.1	47.9	55.8	21.7	27.0
6/15/2004	JUV	30.1	12.7	15.8	6.2	7.1
6/16/2004	F	65.2	28.0	33.3	13.7	16.1
6/16/2004	F	70.1	29.5	34.7	15.0	17.7
6/16/2004	F	52.2	22.8	27.0	11.2	12.8
6/16/2004	F	65.5	29.7	35.0	13.8	17.4
6/17/2004	F	70.0	29.3	34.7	16.7	16.4
6/17/2004	M2	51.1	21.8	26.3	10.5	12.1
6/17/2004	F	43.4	17.3	21.1	8.4	7.6
6/17/2004	F	82.3	29.9	39.7	17.8	19.5
6/17/2004	F	86.7	37.2	43.6	20.2	21.2
6/17/2004	M2	54.4	23.0	27.3	11.3	12.7
6/17/2004	M2	43.3	18.6	21.9	8.6	10.4
6/17/2004	F	77.4	33.0	38.2	16.7	19.4
6/17/2004	M2	52.1	21.6	26.0	9.7	12.5
6/17/2004	M2	73.4	31.9	38.1	15.3	18.0
6/17/2004	M2	48.2	20.9	24.3	10.2	11.5
6/18/2004	F	57.6	24.7	29.3	12.1	13.8
6/24/2004	F	114.9	46.7	56.0	24.4	26.8
6/24/2004	M2	108.7	47.3	54.9	21.0	27.8
6/28/2004	M2	68.3	28.6	33.7	13.2	16.0
6/28/2004	JUV	24.7	10.2	12.2	4.0	5.4
6/28/2004	JUV	23.1	8.4	11.8	3.9	4.6
6/28/2004	JUV	18.4	7.0	8.7	3.2	3.8
6/28/2004	JUV	18.3	7.1	9.1	3.1	3.8
6/29/2004	JUV	30.4	13.0	15.7	5.8	7.3
6/29/2004	JUV	30.5	12.8	16.3	5.7	7.5
6/29/2004	JUV	26.8	10.8	14.4	4.9	6.5

Table B-13. *Cambarus dogenes* —Biometry data.

Date	Sex	Total Length (mm)	Posterior Orbit Ridge-Carapace Length (mm)	Carapace Length (mm)	Abdomen Width (mm)	Carapace Width (mm)
6/29/2004	JUV	31.0	12.8	16.0	5.7	7.4
6/29/2004	JUV	41.4	16.8	20.6	8.5	9.6
6/29/2004	F	101.9	42.2	51.0	20.8	24.0
6/29/2004	F	59.3	23.3	28.1	11.6	13.5
6/29/2004	F	88.5	36.0	42.2	17.6	20.7
6/29/2004	M2	88.8	37.8	45.1	16.9	21.2
6/29/2004	F	98.1	39.6	47.4	23.4	23.4
6/29/2004	F	100.9	42.0	49.8	24.7	23.2
6/29/2004	F	75.7	32.1	38.3	16.0	18.8
6/29/2004	JUV	20.2	7.8	10.0	3.7	4.8
6/29/2004	JUV	24.6	10.6	13.2	3.8	6.0
6/29/2004	JUV	15.3	6.2	8.0	2.5	3.7
6/29/2004	JUV	24.1	10.4	12.8	4.1	6.0
6/29/2004	JUV	19.1	9.2	11.1	3.0	4.8
6/29/2004	JUV	20.0	7.1	9.3	3.4	4.7
6/29/2004	JUV	13.1	5.7	7.1	2.4	3.8
6/29/2004	JUV	19.0	6.7	8.9	3.5	4.3
6/29/2004	JUV	19.3	8.1	10.5	2.9	4.6
7/1/2004	F	59.8	25.1	30.3	11.7	13.6
7/1/2004	F	44.7	18.6	23.2	9.1	10.6
7/12/2004	F	32.1	13.3	15.8	5.5	6.9
7/12/2004	NR	28.2	11.5	14.7	5.2	6.8
7/12/2004	M1	70.5	27.5	35.1	14.9	17.3
7/19/2004	M2	126.4	57.9	67.9	25.5	32.5
7/19/2004	F				6.0	7.5
7/19/2004	F	88.8	35.9	43.3	18.5	20.4
7/19/2004	F	51.6	20.4	24.8	12.2	10.0
7/19/2004	F	48.7	20.0	23.5	9.7	11.5
7/19/2004	M2	88.9	39.1	45.8	17.3	21.3
7/20/2004	M1	89.7	38.4	45.2	17.3	21.4
7/20/2004	F	32.9	13.0	15.9	5.6	7.0
7/20/2004	M2	50.0	21.0	25.0	9.6	11.7
7/22/2004	F	79.6	33.2	39.4	16.3	19.7
7/22/2004	F	71.7	29.6	35.3	15.1	16.2
7/22/2004	F	54.0	22.5	27.4	10.9	13.3
7/22/2004	F	72.6	28.0	34.6	17.1	15.1
7/22/2004	F	86.3	35.1	42.0	18.5	20.6
7/22/2004	M2	52.8	22.0	26.3	10.7	12.4
7/22/2004	M2	36.6	14.8	18.3	6.7	8.9
7/22/2004	F	58.2	23.2	27.7	11.6	13.5
7/22/2004	F	71.4	29.7	35.0	15.1	16.8
7/29/2004	JUV	41.2	17.4	20.8	7.7	9.9
7/29/2004	JUV	39.3	17.1	20.1	6.9	9.6
7/29/2004	JUV	37.4	15.7	18.6	6.8	9.1
7/29/2004	JUV	38.3	16.2	19.6	7.4	9.2
7/29/2004	JUV	35.2	15.2	17.8	6.7	7.9
7/29/2004	F	65.6	26.3	31.5	14.2	15.5

Table B-13. *Cambarus dogenes* —Biometry data.

Date	Sex	Total Length (mm)	Posterior Orbit Ridge-Carapace Length (mm)	Carapace Length (mm)	Abdomen Width (mm)	Carapace Width (mm)
8/4/2004	JUV	16.0	5.3	7.9	2.6	3.8
8/4/2004	JUV	19.6	6.4	9.4	3.1	4.2
8/4/2004	JUV	16.0	6.0	7.8	2.0	2.9
8/4/2004	JUV	16.4	5.3	7.5	2.6	3.4
8/4/2004	JUV	23.9	8.4	11.7	3.9	5.0
8/4/2004	JUV	18.2	6.4	8.3	3.5	4.1
8/4/2004	JUV	20.4	8.7	10.1	3.3	4.5
8/4/2004	JUV	22.0	7.4	9.2	3.5	4.6
8/4/2004	JUV	22.6	7.6	10.8	3.9	4.8
8/4/2004	JUV	23.0	8.0	11.4	3.9	4.9
8/4/2004	JUV	22.6	8.9	11.1	3.8	5.3
8/4/2004	JUV	19.0	6.0	8.5	2.3	3.9
8/4/2004	JUV	17.7	6.2	8.9	2.6	4.2
8/4/2004	F	88.1	34.7	40.9	18.2	16.7
8/4/2004	M2	78.2	33.4	39.4	14.4	18.4
8/4/2004	JUV	23.1	8.9	11.1	4.0	4.9
8/4/2004	JUV	18.0	6.8	8.8	3.2	3.9
8/4/2004	JUV	20.2	7.4	9.0	3.5	4.1
8/4/2004	M2	71.0	29.8	34.8	12.9	16.9
8/4/2004	NR	21.3	8.5	10.4	3.6	4.7
8/4/2004	NR	22.8	8.3	11.2	3.8	5.0
8/4/2004	JUV	18.4	6.8	8.6	2.9	4.0
8/4/2004	F	76.0	29.3	34.8	16.2	15.6
8/4/2004	JUV	15.8	5.2	7.5	2.4	3.3
8/4/2004	F	40.9	15.1	19.4	7.8	9.2
8/4/2004	JUV	23.1	8.6	11.2	4.1	5.2
8/4/2004	F	30.2	12.8	15.4	6.0	7.1
8/4/2004	M2	51.8	23.2	27.3	10.5	11.8
8/5/2004	JUV	20.1	7.3	9.8	3.4	4.1
8/5/2004	JUV	22.1	8.1	10.7	4.2	5.0
8/5/2004	JUV	21.4	8.1	10.3	3.8	4.5
8/5/2004	JUV	23.5	8.8	11.4	4.3	5.1
8/5/2004	JUV	18.7	7.3	9.1	3.2	4.2
8/5/2004	JUV	22.9	8.7	11.2	4.6	3.9
8/5/2004	JUV	20.2	8.0	9.9	3.3	4.3
8/5/2004	JUV	21.7	8.2	10.5	4.0	4.7
8/5/2004	JUV	22.9	9.0	11.6	4.4	5.1
8/5/2004	JUV	23.2	8.7	11.3	4.1	5.1
8/5/2004	JUV	23.0	8.3	11.2	4.4	4.9
8/5/2004	JUV	19.6	7.8	9.2	3.7	4.3
8/5/2004	JUV	24.3	9.0	11.6	4.1	5.2
8/5/2004	JUV	23.8	8.6	12.1	4.5	5.0
8/5/2004	JUV	22.3	8.6	10.8	4.1	5.2
8/5/2004	JUV	23.0	8.5	11.3	4.4	4.7
8/5/2004	JUV	22.8	8.6	11.2	4.0	5.2
8/5/2004	JUV	23.3	8.8	11.8	4.1	4.9
8/5/2004	JUV	18.7	7.0	9.0	2.8	3.6

Table B-13. *Cambarus dogenes* —Biometry data.

Date	Sex	Total Length (mm)	Posterior Orbit Ridge-Carapace Length (mm)	Carapace Length (mm)	Abdomen Width (mm)	Carapace Width (mm)
8/5/2004	JUV	22.1	8.4	11.0	4.0	4.9
8/5/2004	JUV	19.2	7.2	9.2	3.1	4.3
8/5/2004	JUV	23.4	9.3	11.1	3.9	5.2
8/5/2004	JUV	23.7	9.1	11.6	4.1	5.2
8/5/2004	JUV	18.4	6.7	9.0	3.0	3.8
8/5/2004	NR	22.4	8.6	11.1	4.3	5.1
8/9/2004	M2	41.5	16.7	20.1	8.1	10.3
8/9/2004	JUV	24.1	9.8	12.2	4.2	5.0
8/9/2004	F	39.8	16.6	19.9	7.1	9.7
8/9/2004	F	41.1	16.6	19.8	7.0	10.3
8/9/2004	M2	66.6	28.3	33.3	12.6	16.4
8/9/2004	M2	39.2	15.8	19.6	6.6	9.4
8/9/2004	M2	46.8	19.9	23.4	8.9	11.0
8/9/2004	F	42.1	17.5	21.2	8.1	10.5
8/9/2004	F	38.7	16.4	19.1	7.5	9.4
8/9/2004	M2	72.8	31.6	37.0	14.3	18.0
8/9/2004	F	30.6	12.7	15.6	6.0	7.4
8/9/2004	JUV	26.7	10.4	12.9	4.9	5.8
8/9/2004	F	56.2	22.5	27.9	11.1	13.1
8/9/2004	JUV	30.8	12.2	15.5	5.5	6.7
8/9/2004	JUV	32.5	13.2	16.6	6.0	7.3
8/9/2004	JUV	27.3	10.3	13.5	4.5	5.9
8/10/2004	JUV	26.0	9.7	12.7	4.9	5.9
8/10/2004	M2	97.8	42.2	49.9	20.4	24.3
8/10/2004	F	40.2	16.9	20.3	8.0	9.6
8/10/2004	M2	49.7	20.7	25.1	10.0	12.3
8/10/2004	M2	58.4	25.0	29.0	12.3	14.4
8/10/2004	M2	54.6	23.2	27.5	10.7	13.6
8/10/2004	F	46.7	18.8	23.2	9.7	11.5
8/10/2004	M2	37.4	15.4	18.6	6.8	9.1
8/10/2004	M2	82.7	35.0	42.0	16.1	19.9
8/10/2004	M2	77.9	33.4	39.4	15.7	18.7
8/10/2004	F	39.9	16.2	19.8	7.7	9.2
8/10/2004	F	31.2	13.0	16.0	5.9	7.0
8/10/2004	M2	57.3	24.1	28.0	11.4	14.5
8/11/2004	JUV	25.7	10.0	12.7	4.8	5.7
8/11/2004	JUV	32.3	13.0	15.7	5.4	7.2
8/11/2004	JUV	24.9	9.5	12.1	4.3	5.4
8/11/2004	JUV	28.1	11.1	13.6	4.6	6.2
9/1/2004	F	39.4	15.8	20.1	6.9	8.9
9/2/2004	M2	85.2	36.6	44.1	16.2	20.3
9/2/2004	F	26.3	11.2	13.8	4.9	6.3
9/2/2004	M1	98.2	42.4	50.3	19.3	23.7
9/2/2004	M2	50.4	21.5	25.3	9.3	11.7
9/2/2004	M2	78.7	33.4	40.4	15.1	18.3
9/2/2004	F	69.0	28.6	34.1	13.8	15.8
9/2/2004	M2	72.9	30.8	36.7	14.2	17.6

Table B-13. *Cambarus dogenes* —Biometry data.

Date	Sex	Total Length (mm)	Posterior Orbit Ridge-Carapace Length (mm)	Carapace Length (mm)	Abdomen Width (mm)	Carapace Width (mm)
9/2/2004	F	29.5	12.1	15.7	5.4	7.3
9/11/2004	F	61.3	25.8	31.0	13.8	16.5
4/9/2005	M2	49.6	20.4	24.5	9.7	12.5
4/14/2005	M1	84.5	35.7	42.3	16.0	20.1
4/14/2005	M2	83.0	34.4	40.8	15.8	19.4
4/14/2005	M2	74.1	30.7	35.7	13.9	17.3
4/14/2005	M1	101.5	44.5	51.2	20.3	25.0
4/14/2005	M1	73.7	30.6	36.4	14.1	17.3
4/14/2005	F	75.2	31.2	37.0	15.1	17.2
5/7/2005	M2	73.9	31.8	37.2	14.4	17.9
5/7/2005	M2	89.8	38.0	44.8	18.3	22.0
5/7/2005	F	114.9	47.8	55.4	26.3	27.7
5/7/2005	M1	110.5	48.7	56.4	22.9	27.2
5/7/2005	M1	116.7	52.6	61.4	23.3	30.4
5/11/2005	M1	118.9	52.9	62.3	23.0	30.7
5/11/2005	M2	92.3	38.7	46.6	18.5	21.8
5/11/2005	F	81.4	33.1	39.1	16.3	19.4
5/11/2005	M2	57.9	25.3	29.7	12.0	14.3
5/11/2005	M1	103.2	43.0	51.3	20.1	24.6
5/11/2005	F	45.8	18.7	22.1	8.2	10.5
5/11/2005	M2	41.6	17.2	21.1	8.1	9.8
5/11/2005	F	96.5	41.0	48.4	19.5	24.3
5/11/2005	M2	63.0	25.7	30.8	12.3	15.1
5/11/2005	M2	66.1	27.4	32.6	13.3	16.3
5/12/2005	M2	58.9	24.7	30.2	11.8	13.9
5/12/2005	M2	42.0	17.9	21.6	8.3	9.6
5/13/2005	M1	108.1	49.4	58.6	21.7	28.0
5/13/2005	F	103.1	43.1	51.7	21.7	24.7
5/13/2005	JUV	27.2	10.8	13.9	4.6	5.7
5/13/2005	M1	80.8	36.1	42.8	16.2	19.8
5/13/2005	M2	56.8	23.5	28.4	11.4	13.0
5/13/2005	M2	44.0	18.9	22.5	8.5	10.7
5/13/2005	F	75.2	32.5	38.2	15.5	18.0
5/13/2005	F	73.2	30.3	36.8	14.9	17.5
5/13/2005	F	108.6	44.7	53.6	25.3	26.4
5/16/2005	F	114.5	47.3	56.9	27.5	26.9
5/16/2005	F	88.2	37.5	44.3	17.6	21.2
5/16/2005	M1	105.7	45.4	53.8	20.4	26.6
5/16/2005	M2	82.5	35.4	41.8	16.2	19.2
5/16/2005	M1	110.6	48.6	57.4	21.5	28.4
5/16/2005	F	106.8	44.6	53.3	22.0	27.0
5/16/2005	F	94.1	39.0	46.9	19.0	23.3
5/17/2005	M2	70.6	30.0	35.6	13.7	17.0
5/17/2005	M1	85.7	37.4	43.7	17.1	22.1
5/17/2005	OVIG	119.0	49.5	57.5	26.9	29.1
5/17/2005	OVIG	129.4	53.2	63.6	31.1	31.3
5/17/2005	M1	117.4	57.1	61.4	23.6	30.4

Table B-13. *Cambarus dogenes* —Biometry data.

Date	Sex	Total Length (mm)	Posterior Orbit Ridge-Carapace Length (mm)	Carapace Length (mm)	Abdomen Width (mm)	Carapace Width (mm)
5/17/2005	F	99.0	42.2	50.4	20.1	25.2
5/17/2005	F	59.4	25.7	30.0	12.2	13.7
5/17/2005	M1	94.8	42.9	50.6	19.1	24.1
5/17/2005	JUV	43.7	17.9	21.2	8.1	10.2
5/17/2005	NR	71.0	30.5	36.6	14.3	17.0
5/18/2005	M2	63.7	26.1	32.3	12.5	15.0
5/18/2005	OVIG	117.9	49.2	58.3	27.5	28.5
5/18/2005	M1	83.9	35.9	42.5	18.4	21.6
5/18/2005	F	104.9	41.6	50.7	24.1	25.2
5/18/2005	M2	61.3	27.3	31.7	12.7	15.1
5/18/2005	M2	105.5	45.8	53.7	21.0	28.0
5/18/2005	F	78.0	32.8	38.8	16.2	18.6
5/18/2005	F	48.6	19.8	24.7	10.0	11.5
5/18/2005	F	43.0	17.9	21.9	9.1	10.6
5/18/2005	F	76.5	32.3	37.7	15.0	18.5
5/23/2005	F	96.5	40.6	48.1	22.9	22.5
5/23/2005	F	112.8	47.4	55.8	28.4	26.5
5/23/2005	F	131.7	55.6	63.7	30.6	32.6
5/23/2005	M1	109.1	48.2	56.0	22.3	26.9
5/23/2005	M1	113.4	50.8	60.0	22.3	30.0
5/23/2005	M1	104.0	45.6	53.8	20.7	26.0
5/23/2005	F	107.8	44.1	52.7	27.2	24.4
5/23/2005	M2	75.6	31.6	37.8	15.4	17.6
5/23/2005	F	98.4	39.3	48.1	23.7	22.7
5/23/2005	M2	58.9	25.7	29.3	11.4	13.7
5/23/2005	JUV	16.3	6.7	8.6	3.1	4.0
5/23/2005	M1	115.1	51.4	60.9	23.5	29.5
5/23/2005	F	108.0	44.8	52.5	26.3	25.0
5/23/2005	JUV	18.1	7.6	8.8	3.2	3.9
5/23/2005	F	63.0	26.1	31.1	12.8	14.9
5/23/2005	F	94.3	40.0	47.8	21.4	22.7
5/23/2005	M2	67.1	61.8	67.0	13.5	16.4
5/23/2005	M2	71.1	31.1	36.2	13.0	17.0
5/23/2005	JUV	9.2	3.5	4.4	1.6	1.9
5/23/2005	JUV	9.8	3.2	4.9	1.6	2.0
5/23/2005	M2	44.4	20.3	24.3	8.2	10.6
5/23/2005	M2	63.5	26.2	31.4	12.7	15.5
5/23/2005	M1	94.7	40.5	48.7	18.9	23.9
5/23/2005	M1	92.5	41.8	49.1	18.3	23.1
5/23/2005	M2	56.6	24.4	28.7	10.9	13.6
5/23/2005	M2	72.8	30.8	37.1	13.9	17.9
5/23/2005	F	103.5	42.3	50.3	24.0	24.7
5/23/2005	F	106.9	43.1	51.4	25.4	24.6
5/23/2005	F	64.9	26.8	32.3	12.8	15.2
5/23/2005	F	75.9	32.9	39.4	15.4	18.1
5/24/2005	M1	89.2	38.8	46.1	18.3	23.6
5/24/2005	M1	108.8	48.6	56.9	22.1	26.7

Table B-13. *Cambarus dogenes* —Biometry data.

Date	Sex	Total Length (mm)	Posterior Orbit Ridge-Carapace Length (mm)	Carapace Length (mm)	Abdomen Width (mm)	Carapace Width (mm)
5/24/2005	M1	95.4	42.6	50.8	19.3	24.8
5/24/2005	F	90.6	38.6	46.1	18.4	22.4
5/24/2005	F	92.4	38.3	45.7	22.4	21.7
5/24/2005	F	104.7	43.1	51.4	25.6	24.3
5/24/2005	JUV	18.3	7.2	9.2	3.7	4.7
5/24/2005	F	53.7	22.5	27.3	10.5	12.2
5/24/2005	F	70.8	30.4	36.0	14.7	17.2
5/24/2005	M1	94.0	41.8	48.9	19.2	24.0
5/24/2005	M2	70.5	30.9	37.0	13.5	16.3
5/24/2005	JUV	15.2	6.5	9.5	3.1	4.2
5/24/2005	M2	70.3	30.4	36.1	14.2	17.2
5/24/2005	M2	72.5	31.1	38.0	15.0	18.3
5/24/2005	F	109.6	44.8	54.9	28.1	26.5
5/24/2005	F	57.4	24.6	29.5	11.6	13.9
5/24/2005	M2	58.4	26.0	30.7	11.6	15.0
5/24/2005	JUV	15.7	5.2	8.6	2.2	3.9
5/24/2005	F	104.4	45.2	53.3	20.8	25.0
5/24/2005	M1	91.1	40.6	47.6	18.1	22.8
5/24/2005	F	81.6	34.7	41.3	16.3	20.1
5/24/2005	M2	76.1	32.2	38.5	15.4	18.6
5/25/2005	M1	132.0	57.2	68.4	27.2	33.9
5/25/2005	M1	133.3	60.0	70.1	27.2	34.0
5/25/2005	JUV	21.0	8.3	10.7	4.0	4.9
5/25/2005	JUV-M	42.2	19.0	23.0	8.1	11.5
5/25/2005	F	91.6	41.1	47.7	18.6	22.1
5/25/2005	JUV	16.0	7.0	8.8	3.0	4.2
5/26/2005	M1	88.0	36.9	44.9	17.8	21.2
5/26/2005	M2	79.7	34.2	41.8	16.5	19.3
6/14/2005	F	61.8	25.8	30.8	12.3	15.1
6/14/2005	F	99.7	41.2	47.6	23.7	24.4
6/14/2005	F	85.0	35.3	41.2	17.8	20.6
6/14/2005	F	58.3	24.1	28.0	11.6	14.3
6/14/2005	M2	52.9	22.0	26.2	10.2	13.0
6/14/2005	F	80.2	33.1	39.2	16.1	18.8
6/14/2005	M2	49.5	20.7	24.4	9.4	11.5
6/14/2005	F	83.9	34.4	41.0	17.3	20.3
6/14/2005	JUV	30.4	12.1	14.7	5.7	6.6
6/14/2005	F	122.0	50.3	58.8	28.2	29.5
6/15/2005	F	99.7	43.4	50.5	21.4	25.7
6/22/2005	F	93.4	37.6	45.5	18.2	20.4
6/22/2005	M2	93.0	41.6	49.6	17.4	22.6
6/27/2005	M1	116.4	50.0	59.6	22.2	29.0
6/27/2005	F	47.2	19.7	23.6	9.5	10.8
6/27/2005	M2	63.4	26.8	32.1	12.3	14.7
6/27/2005	M1	113.7	48.5	58.4	22.7	26.9
6/28/2005	NR	18.7	7.5	8.9	3.5	4.3
6/28/2005	M1	95.4	41.2	49.0	18.9	24.1

Table B-13. *Cambarus dogenes* —Biometry data.

Date	Sex	Total Length (mm)	Posterior Orbit Ridge-Carapace Length (mm)	Carapace Length (mm)	Abdomen Width (mm)	Carapace Width (mm)
6/28/2005	F	80.8	33.8	41.0	16.4	18.9
6/28/2005	JUV	20.7	8.0	10.8	3.9	5.3
6/28/2005	M1	74.0	31.1	37.4	14.7	16.7
6/28/2005	F	100.8	41.3	49.7	24.1	23.7
6/28/2005	M2	70.2	30.6	34.2	14.0	16.8
6/29/2005	M2	85.0	35.4	42.1	17.6	21.9
6/29/2005	M2	109.9	47.0	55.0	21.6	31.1
6/30/2005	JUV	17.9	6.8	9.2	2.9	4.2
6/30/2005	JUV	18.7	7.5	9.7	3.4	4.5
6/30/2005	JUV	15.9	6.7	8.2	2.6	3.6
6/30/2005	M2	58.7	24.6	29.1	11.7	13.9
6/30/2005	F	78.2	32.3	37.9	15.9	18.5
6/30/2005	M2	60.5	25.5	29.8	12.0	14.6
6/30/2005	F	85.8	35.7	41.6	17.8	21.2
6/30/2005	M2	75.1	32.3	37.7	14.9	18.7
7/6/2005	F	43.5	17.9	20.8	8.4	10.2
7/6/2005	M2	85.9	36.3	42.5	16.3	20.9
7/6/2005	F	103.2	40.3	49.0	22.8	21.0
7/6/2005	F	65.7	27.4	32.9	13.1	16.5
7/6/2005	F	78.1	32.8	38.8	15.7	19.2
7/19/2005	F	46.5	19.1	22.4	8.8	10.5
7/21/2005	F	37.4	14.4	17.8	6.8	7.7
7/26/2005	M2	115.8	50.3	58.7	22.1	30.2
7/26/2005	M2	105.0	44.8	52.2	20.3	27.3
7/26/2005	M2	99.1	42.9	50.1	18.8	25.4
7/26/2005	F	89.2	35.9	43.1	18.0	21.7
7/26/2005	NR	105.7	43.7	50.7	21.4	26.3
7/26/2005	M1	69.4	28.6	33.8	12.1	15.6
7/26/2005	M1	79.8	33.9	41.4	15.0	18.2
8/3/2005	JUV	20.9	8.3	10.2	3.5	4.8
8/3/2005	JUV	23.6	10.3	11.9	4.2	5.0
8/3/2005	M1	92.0	40.0	46.8	18.0	23.3
8/3/2005	F	81.5	33.8	39.9	16.0	20.1
8/3/2005	M2	103.7	46.4	53.1	20.2	26.8
8/3/2005	F	103.8	43.3	49.6	22.7	24.5
8/3/2005	F	66.2	28.3	32.8	12.9	16.4
8/9/2005	JUV	43.1	18.1	21.5	8.5	10.9
8/9/2005	JUV	28.7	11.4	14.2	5.1	7.3
8/9/2005	JUV	37.3	15.4	18.5	6.7	9.3
8/9/2005	JUV	34.6	13.8	17.3	6.6	8.7
8/9/2005	M2	93.3	40.3	47.3	19.4	24.2
8/9/2005	JUV	40.7	16.6	20.4	7.8	10.6
8/9/2005	JUV	40.6	17.0	20.7	8.3	10.3
8/9/2005	F	74.5	31.1	36.5	16.4	18.4
8/9/2005	F	95.4	38.0	46.0	21.9	22.7
8/9/2005	M2	77.7	33.6	38.3	15.3	20.0
8/9/2005	F	97.4	40.4	47.0	22.2	23.3

Table B-13. *Cambarus dogenes* —Biometry data.

Date	Sex	Total Length (mm)	Posterior Orbit Ridge-Carapace Length (mm)	Carapace Length (mm)	Abdomen Width (mm)	Carapace Width (mm)
8/9/2005	JUV	34.4	13.3	17.1	6.2	8.3
8/9/2005	F	92.4	38.7	45.4	21.3	22.6
8/9/2005	M2	74.3	31.6	37.5	14.9	19.0
8/9/2005	JUV	36.3	15.3	17.9	7.5	8.9
8/9/2005	JUV	40.7	16.2	20.2	7.7	9.5
8/9/2005	M2	66.2	28.3	34.2	13.6	16.6
8/10/2005	M2	75.6	31.6	37.0	15.3	17.8
8/10/2005	F	60.9	25.1	30.4	13.5	14.5
8/10/2005	M2	64.0	27.9	32.7	13.1	15.5
8/10/2005	F	46.7	18.9	23.0	9.3	12.2
8/10/2005	F	47.1	19.4	22.6	9.8	11.6
8/10/2005	M2	64.4	26.8	31.8	12.9	15.1
8/10/2005	F	90.4	37.3	42.6	22.3	21.1
8/10/2005	NR	96.2	42.8	49.6	19.5	24.9
8/11/2005	F	48.3	20.4	23.8	9.6	11.3
8/11/2005	JUV	41.2	16.6	20.3	7.1	8.9
8/11/2005	M1	66.4	30.6	35.3	13.0	18.5
8/11/2005	F	88.4	36.8	42.8	20.2	21.0
8/11/2005	M2	58.7	26.7	30.8	12.0	14.6
8/11/2005	M1	103.1	48.2	55.5	21.6	30.3
8/11/2005	JUV	29.7	12.0	14.2	5.9	7.3
8/11/2005	JUV	38.3	16.3	19.4	7.2	9.9
8/11/2005	M2	67.2	28.2	33.5	13.8	16.6
8/11/2005	JUV	33.5	13.0	17.2	6.7	8.3
8/11/2005	JUV	33.1	14.2	16.3	6.5	8.2
8/11/2005	JUV	39.7	16.5	19.9	7.7	9.9
8/11/2005	JUV	42.5	18.7	20.8	7.7	11.0
8/11/2005	F	65.4	26.2	31.8	13.2	15.3
8/11/2005	F	80.8	34.4	40.1	17.1	19.6
8/25/2005	F	91.6	38.3	44.3	21.1	21.8
8/25/2005	M2	51.3	21.4	25.5	10.3	12.0
9/8/2005	M2	55.9	23.5	27.1	10.7	14.2
9/8/2005	F	65.1	27.1	32.5	12.9	15.9
9/8/2005	F	87.0	36.9	43.0	7.7	21.9

Table B-14. *Fallicambarus fodiens* —Biometry data.

Date	Sex	Total Length (mm)	Posterior Orbital Ridge-Carapace Length (mm)	Carapace Length (mm)	Abdomen Width (mm)	Carapace Width (mm)
	F	83.6	34.3	39.2	18.7	19.2
	M1	74.9	32.6	37.7	14.5	18.6
	F	83.8	34.0	39.4	19.3	19.6
	M1	79.7	35.2	40.2	15.1	19.4
3/25/2001	F		34.5	40.0	19.9	
3/26/2001	M1	61.3	26.0	30.2	12.4	14.5
3/26/2001	M2	53.5	23.0	26.9	11.4	13.1
4/4/2001	F	68.8	27.5	32.6	15.1	16.0
4/4/2001	F	80.9	31.4	36.8	17.6	18.2
4/5/2001	F	64.7	26.3	31.3	13.2	14.8
4/11/2001	F	81.2	31.4	37.9	18.9	18.7
4/11/2001	F	78.5	30.5	35.7	17.9	17.0
4/11/2001	F	66.5	26.7	31.1	14.2	15.1
6/14/2004	F	50.8	20.9	24.5	11.6	11.9
8/11/2004	F	76.6	31.9	36.7	16.9	17.3
8/11/2004	NR	63.0	26.4	30.5	12.3	14.1
8/11/2004	M1	70.7	31.3	36.3	14.1	18.0
8/11/2004	M2	33.2	12.8	16.6	6.4	7.9
8/11/2004	M1	58.8	25.2	29.7	11.2	12.7
8/11/2004	F	51.9	21.9	25.5	10.4	12.1
8/11/2004	F	73.4	30.3	35.9	15.8	16.5
8/11/2004	F	52.9	22.2	25.8	10.9	12.1
8/11/2004	F	49.6	21.0	24.4	10.5	11.9
8/11/2004	F	67.1	28.4	32.5	15.4	15.4
4/8/2005	F	72.3	29.7	34.9	15.4	17.9
4/8/2005	F	72.5	29.7	34.2	15.3	16.6
4/8/2005	F	79.7	31.5	36.5	18.1	18.4
4/8/2005	M1	81.0	36.9	42.4	15.5	21.2
4/8/2005	M2	65.6	27.7	33.0	12.8	15.6
4/8/2005	F	65.9	27.8	32.5	13.2	15.3
4/8/2005	M2	72.1	32.8	36.8	14.4	18.8
4/8/2005	M2	73.0	31.8	37.1	14.9	18.6
4/8/2005	M2	61.4	26.6	31.4	11.4	14.3
4/8/2005	F	73.1	30.3	35.1	16.0	17.3
4/8/2005	F	69.2	27.1	32.3	14.8	16.7
4/8/2005	F	60.8	24.6	28.5	12.2	14.1
5/11/2005	F	83.6	34.3	39.2	18.7	19.2
5/11/2005	M1	79.7	35.2	40.2	15.1	19.4
5/11/2005	M1	74.9	32.6	37.7	14.5	18.6
5/11/2005	F	83.8	34.0	39.4	19.3	19.6
5/12/2005	F	80.9	31.4	37.0	18.2	18.2
5/12/2005	F	78.8	31.1	37.1	16.6	19.2
5/12/2005	F	70.0	27.7	32.5	14.1	15.8
5/12/2005	JUV	17.2	6.7	8.6	2.9	3.9
5/12/2005	M1	80.6	33.5	38.6	15.7	18.9
5/12/2005	JUV	23.7	9.7	11.4	4.2	5.5
5/12/2005	F	47.1	18.4	22.5	9.2	11.1

Table B-14. *Fallicambarus fodiens* —Biometry data.

Date	Sex	Total Length (mm)	Posterior Orbital Ridge-Carapace Length (mm)	Carapace Length (mm)	Abdomen Width (mm)	Carapace Width (mm)
5/25/2005	F	63.7	63.7	26.2	13.3	14.4
6/15/2005	F	76.1	31.1	36.7	18.4	17.1
6/15/2005	M2	66.7	27.9	32.3	12.7	15.4
6/15/2005	M2	69.6	29.1	33.9	13.7	16.3
6/21/2005	F	75.0	31.0	36.4	15.9	17.3
6/21/2005	M2	71.4	30.9	36.4	14.2	17.5
6/21/2005	F	75.0	29.8	35.5	16.3	17.2
6/21/2005	M1	72.6	29.2	37.2	14.3	19.2
6/21/2005	F	69.0	27.1	32.9	14.1	15.9
6/21/2005	F	78.2	31.6	38.2	18.3	19.6
6/22/2005	F	77.0	30.7	36.9	18.2	19.5
7/19/2005	M1	83.4	37.3	43.9	16.9	21.2
7/19/2005	F	80.5	33.8	39.3	18.1	19.0
7/19/2005	F	75.0	31.7	36.9	17.5	17.4
7/19/2005	M2	76.6	33.5	40.1	15.7	18.5
7/19/2005	M1	73.0	32.9	38.2	14.6	17.8
7/19/2005	M2	79.6	36.1	40.7	15.4	20.1
7/19/2005	JUV	29.5	12.6	14.7	5.4	0.8
7/20/2005	M1	70.7	31.4	37.3	14.6	17.5
7/20/2005	F	81.1	33.3	38.8	18.7	18.8
7/20/2005	M1	76.3	34.2	39.2	15.4	19.2
7/26/2005	M2	59.7	25.1	29.4	10.9	13.6
7/26/2005	F	29.8	12.2	14.8	5.4	7.1
9/8/2005	M1	66.0	27.4	32.1	13.1	15.4
9/8/2005	M1	78.0	34.5	40.5	15.7	19.6
9/8/2005	F	74.2	30.5	36.1	17.1	18.4

Table B-15. *Cambarus ortmanni* —Biometry data.

Date	Sex	Total Length (mm)	Posterior Orbital Ridge-Carapace Length (mm)	Carapace Length (mm)	Abdomen Width (mm)	Carapace Width (mm)
32012	M1	81.82	38.18	44.25	18.09	22.77
8/29/1987	F	86.0	39.9	46.2	20.3	24.0
6/16/2004	M2	69.0	28.5	33.8	13.4	20.2
8/9/2004	F	48.3	20.4	24.2	10.1	12.0
8/11/2004	F	43.6	20.0	23.3	10.0	12.0
8/11/2004	M2	46.2	20.6	24.9	9.9	12.8
8/11/2004	M2	46.9	20.9	24.6	10.0	12.8
8/11/2004	M2	50.7	22.9	26.9	11.2	13.4
8/11/2004	F	48.5	21.4	25.7	10.3	13.0
8/11/2004	M2	49.5	21.2	25.4	10.3	12.9
8/11/2004	M2	52.2	23.1	27.7	11.0	14.1
8/11/2004	M2	43.0	18.5	22.5	8.8	12.4
8/12/2004	F	76.6	34.3	40.2	17.2	21.2
8/13/2004	F	42.9	18.2	22.2	9.1	11.1
8/13/2004	F	46.6	20.1	23.8	9.9	11.7
8/13/2004	F	66.7	30.8	36.4	15.2	19.1
8/16/2004	F	83.7	38.8	45.1	18.8	23.6
8/16/2004	M2	53.8	24.2	28.2	10.9	14.1
8/16/2004	M2	72.9	34.8	40.1	15.3	20.7
8/16/2004	F	84.5	38.5	44.6	18.2	23.5
5/16/2005	F	65.1	29.1	33.6	14.4	17.0
5/17/2005	M2	41.8	18.4	22.0	8.9	10.9
6/13/2005	M2	43.7	20.0	23.9	9.2	11.4
6/13/2005	F	35.5	15.0	18.2	7.4	9.3
6/13/2005	F	39.0	16.4	19.9	7.6	9.7
6/13/2005	M2	35.4	16.3	19.3	7.3	9.8
6/13/2005	F	52.8	23.9	27.9	11.1	13.9
6/13/2005	M2	65.3	29.7	35.1	13.8	17.7
6/13/2005	F	77.0	35.5	40.9	16.8	21.5
6/13/2005	F	46.9	21.4	25.1	10.1	12.3
6/13/2005	F	41.8	18.0	21.2	8.4	10.4
6/13/2005	F	40.0	17.6	20.5	8.0	9.9
6/14/2005	M2	55.4	25.3	29.0	11.7	14.6
6/14/2005	M2	70.9	31.9	37.5	14.9	18.5
6/14/2005	M2	72.4	33.3	38.1	15.2	19.6
6/14/2005	F	72.9	32.9	38.0	16.4	19.5
6/14/2005	F	40.4	17.2	20.4	8.7	10.3
6/15/2005	F	66.2	31.9	37.1	15.5	18.9
6/15/2005	F	65.5	29.9	34.0	13.6	17.6
6/15/2005	M2	71.9	33.5	38.8	15.1	19.5
6/16/2005	F	62.3	28.1	33.0	14.0	16.7
6/16/2005	M2	57.2	26.1	30.5	12.8	15.3
6/16/2005	M2	64.5	29.7	34.2	14.1	17.5
6/16/2005	M2	73.8	34.1	39.2	15.5	20.0
6/16/2005	F	54.7	25.8	30.1	12.7	15.1
6/17/2005	F	76.3	36.2	41.6	17.6	21.1
6/17/2005	OVIG	92.2	43.4	49.6	21.3	24.8

Table B-15. *Cambarus ortmanni* —Biometry data.

Date	Sex	Total Length (mm)	Posterior Orbital Ridge-Carapace Length (mm)	Carapace Length (mm)	Abdomen Width (mm)	Carapace Width (mm)
6/29/2005	M2	49.9	22.5	26.6	10.5	13.2
6/29/2005	M2	77.2	35.9	41.7	16.7	21.9
6/29/2005	F	59.0	27.1	31.1	13.1	15.5
6/29/2005	F	78.7	35.8	41.9	18.5	21.3
6/29/2005	F	85.7	39.8	45.5	19.6	23.6
6/29/2005	M2	76.7	35.5	41.1	16.9	20.5
6/29/2005	F	77.2	35.5	41.7	17.3	22.0
6/29/2005	M2	59.1	27.0	31.2	13.3	15.9
6/29/2005	M2	49.1	20.7	24.8	10.4	12.4
6/30/2005	M2	52.5	24.2	28.5	11.7	14.4
7/1/2005	F	88.5	39.8	46.6	19.9	23.8
7/5/2005	M2	83.0	39.7	45.6	18.9	23.7
7/5/2005	M2	60.3	23.9	31.9	12.6	15.8
7/5/2005	F	61.2	27.6	32.6	13.5	15.9
7/5/2005	M2	71.3	33.0	38.0	15.6	19.8
7/5/2005	M2	66.3	29.8	35.2	14.1	18.1
7/6/2005	M2	45.2	19.9	23.4	9.6	10.9
7/6/2005	F	41.7	17.9	20.8	8.3	10.1
7/6/2005	OVIG	90.4	43.7	49.6	20.3	24.5
7/7/2005	M2	56.2	26.7	31.4	12.3	15.7
7/7/2005	F	40.8	18.4	21.6	8.8	10.9
7/7/2005	F	41.6	19.3	21.8	8.6	11.3
7/7/2005	M1	78.5	35.7	41.3	16.7	22.3
7/7/2005	F					
7/7/2005	M2					
7/7/2005	F					
7/26/2005	F	44.1	18.4	22.6	8.6	10.9
7/26/2005	F	86.8	39.2	46.3	19.7	24.8
7/26/2005	M2	60.7	27.1	32.3	12.9	17.6
7/27/2005	F	80.5	37.1	42.7	18.4	22.7
7/27/2005	F	89.5	41.8	47.5	19.6	24.5
7/27/2005	M2	44.5	18.9	22.6	9.5	11.2
7/27/2005	F	85.0	39.8	45.7	19.1	23.4
7/27/2005	F	75.8	33.8	39.4	17.8	20.9
7/28/2005	M2	41.3	18.3	22.0	8.8	11.4
7/28/2005	F	86.8	41.3	47.4	20.4	25.3
7/28/2005	F	67.7	30.4	35.0	14.8	16.3
7/28/2005	F	53.3	24.0	28.2	11.2	13.1
8/23/2005	F	73.3	32.9	38.7	15.4	19.9
8/23/2005	F	72.8	31.8	37.5	16.4	19.7
8/23/2005	F	70.3	31.1	36.1	15.5	18.7
8/23/2005	M1	89.8	41.1	48.1	19.5	26.1
8/23/2005	M2	77.5	35.8	42.2	17.4	21.9
8/23/2005	F	73.6	34.0	39.6	19.6	15.9

Table B-16. *Procambarus gracilis* —Biometry data.

Date	Sex	Total Length (mm)	Posterior Orbital Ridge-Carapace Length (mm)	Carapace Length (mm)	Abdomen Width (mm)	Carapace Width (mm)
6/14/2004	M1	57.60	26.22	31.72	11.56	14.07
6/14/2004	M1	51.2	22.7	27.1	10.2	11.8
6/14/2004	F	60.9	26.9	32.0	12.9	14.3
6/14/2004	M2	51.0	22.7	27.4	10.0	12.2
6/14/2004	F	31.7	13.8	17.4	5.7	7.4
6/15/2004	F	66.3	29.5	35.3	14.3	15.9
6/16/2004	NR		42.2	52.9		27.8
6/17/2004	M1	65.3	31.3	37.1	12.6	16.0
6/17/2004	F	64.4	29.5	34.8	13.5	15.3
6/17/2004	F	67.5	30.2	36.0	14.1	15.6
6/17/2004	F	66.5	29.9	35.5	13.8	15.6
6/17/2004	F	78.3	35.7	41.9	16.4	18.7
6/17/2004	F	82.8	38.2	45.1	17.4	20.0
8/5/2004	M2	43.3	18.6	22.7	8.4	10.2
8/6/2004	M1	59.0	27.4	32.6	11.4	14.6

Appendix 3

Task 3

Burrow Ecology

Table C-3. Morphology of burrows examined in the burrow ecology study.

Name	Burrow number	Water body	individual	No. individ.	Sex	carapace length	active	# entrances	chimneys	chim heigth mm	surface plugs	sub-surface plugs	entr diam. mm	water depth cm	burrow depth cm	laterals	chamber	notes
BBB0547	47	Bean Blossom Bottom	unknown	1			1	1	1	12.0	1	0	45.0	45.00	150.00	0	0	
BBB0548	48	Bean Blossom Bottom	unknown	1			1	1	1	8.5	0	0	40.0	50.00	134.00	0	0	
HP0506	6	Hoosier Prairie	P acutus	1	f	50.23	1	2	1	5.0	0	0	50.0	0.00	19.00	0	1	
RFT-04-45	8	Hoosier Prairie	P acutus	1	f	38.48	1	1	1	4.0	1	0	40.0	23.00	25.00	0	1	
RFT-04-87	10	Twin Swamps	P acutus	1	f		1	1	1	10.1	1	0	50.8	134.60	134.60	0	0	
RFT-04-45	4	Hoosier Prairie	O immunis	1	f	30.65	1	1	0	0.0	1	0	30.0	25.00	55.00	1	0	
RFT-04-45	1	Hoosier Prairie	O immunis	1	m1	25.99	1	1	0	0.0	1	0	18.0	26.00	28.00	2	0	
RFT-04-45	11	Hoosier Prairie	O immunis	1	m1	28.60	1	1	1	7.5	0	0	25.0	20.00	51.00	0	0	
BBB0551	51	Bean Blossom Bottom	F fodiens	1	f		0	1	1	11.5	1	0	50.0	60.00	122.00	0	0	
BBB05-10	10	Bean Blossom Bottom	F fodiens	1	f		1	1	1	40.0	0	0	35.0	47.00	68.00	0	0	
BBB0543	43	Bean Blossom Bottom	F fodiens	1	f		1	1	1	9.5	1	0	35.0	40.00	133.00	0	0	
BBB0544	44	Bean Blossom Bottom	F fodiens	1	f		1	1	1	45.0	1	0	50.0	42.00	160.00	0	0	
BFB0510	10	Bloomfield Barrens	F fodiens	1	f	34.40	1	2	1	7.8	1	0	22.0			1	0	
BFB0516	16	Bloomfield Barrens	F fodiens	1	f	30.27	1	1	1	7.0	1	1	45.0	200.00	200.00	0	0	
HP0501	1	Hoosier Prairie	F fodiens	1	f	25.46	1	1	1	6.0	0	0	35.0	10.00	30.00	0	0	
HP0502	2	Hoosier Prairie	F fodiens	1	f	29.23	1	1	1	25.0	0	0	25.0	18.00	47.00	1	0	
HP0504	4	Hoosier Prairie	F fodiens	1	f	26.52	1	1	1	4.0	0	0	20.0	22.00	35.00	0	0	
HP0509	9	Hoosier Prairie	F fodiens	1	f	27.81	1	1	1	6.0	1	0	25.0	29.00	34.00	1	0	
HP0510	10	Hoosier Prairie	F fodiens	1	f	25.97	1	1	1	5.5	1	0	25.0	30.00	55.00	0	0	
RFT-04-45	2	Hoosier Prairie	F fodiens	1	f	22.15	1	1	1	6.0	1	0	22.0	25.00	31.00	0	0	
RFT-04-45	3	Hoosier Prairie	F fodiens	1	f	31.65	1	1	0	0.0	1	0	25.0	18.00	20.00	1	0	
RFT-04-45	5	Hoosier Prairie	F fodiens	1	f	29.34	1	1	1	6.5	1	0	28.0	32.00	41.50	0	0	
RFT-04-45	12	Hoosier Prairie	F fodiens	1	f	20.64	1	1	1	5.0	1	0	12.0	20.00	35.00	1	0	
RFT-04-45	18	Hoosier Prairie	F fodiens	1	f	18.90	1	1	1	6.0	0	0	20.0	30.00	54.00	0	0	
RFT-04-89	13	Hoosier Prairie	F fodiens	1	f	18.58	1	1	0	0.0	1	0	19.0	22.80	22.80	0	0	
RFT-04-89	14	Hoosier Prairie	F fodiens	1	f	22.10	1	1	1	2.5	0	0	22.0	25.50	25.50	0	0	
TS0401	1	Twin Swamp	F fodiens	1	f	33.00	1	3	2	4.2	0	0	15.0	10.00	25.00	2	1	
TS0401	3	Twin Swamps	F fodiens	1	f	29.11	1	3	3	3.0	0	0	27.0	27.00	59.50	1	1	
TS0401	6	Twin Swamps	F fodiens	1	f	36.80	1	2	1	2.5	1	0	25.0	17.00		1	1	
TS0401	8	Twin Swamps	F fodiens	1	f	30.95	1	1	1	2.0	1	0	25.0	16.50	24.50	1	1	
TS0401	10	Twin Swamps	F fodiens	1	f	35.04	1	5	5	6.5	1	0	35.0	25.00	35.00	1	1	
RFT-04-87	3	Twin Swamps	F fodiens	1	f		1	2	2	6.3	1	1	38.0	68.60	68.60	0	0	

Table C-3. Morphology of burrows cont.																		
Name	**Burrow number**	**Water body**	**individual**	**No. individ.**	**Sex**	**carapace length**	**active**	**# entran ces**	**chimn eys**	**chim heigth mm**	**surface plugs**	**sub-surface plugs**	**entr diam. mm**	**water depth cm**	**burrow depth cm**	**laterals**	**cham ber**	**notes**
RFT-04-87	9	Twin Swamps	F fodiens	1	f		1	3	3	5.1	1	0	38.0	91.40	91.40	0	0	
RFT-04-44	1	Twin Swamps	F fodiens	1	f	19.98	1	3	3	4.6	3	0	12.0	53.30	53.30	0	0	
RFT-04-44	6	Twin Swamps	F fodiens	1	f	19.95	1	1	1	12.5	1	0	18.0	91.50	91.50	0	0	
RFT-04-44	7	Twin Swamps	F fodiens	1	f	33.60	1	1	1	11.5	1	0	32.0	106.70	106.70	0	0	
RFT-04-44	9	Twin Swamps	F fodiens	1	f	25.95	1	1	1	50.0	1	0	18.0	60.90	60.90	0	0	
BFB0509	9	Bloomfield Barrens	F fodiens	5	f,j	34.65	1	2	1	18.0	1	0	28.0	49.00	73.00	1	0	
BBB0540	40	Bean Blossom Bottom	F fodiens	1	f-ovig		1	1	1	9.5	1	0	30.0	45.00	123.00	0	0	
BBB0545	45	Bean Blossom Bottom	F fodiens	1	m1		1	1	1	13.0	1	0	40.0	60.00	145.00	0	0	
RFT-04-44	10	Twin Swamps	F fodiens	1	m1	30.73	1	3	3	6.3	2	0	24.0	85.30	91.50	0	0	soft bodied fresh molt crayfish
RFT-04-44	13	Twin Swamps	F fodiens	1	m1	32.86	1	1	1	3.5	1	0	40.0	91.50	91.50	0	0	
BBB0552	52	Bean Blossom Bottom	F fodiens	2	m1,f		1	1	4	9.5	4	0	60.0	55.00	140.00	0	0	
BBB0549	49	Bean Blossom Bottom	F fodiens	1	m2		1	1	1	11.0	1	0	40.0	50.00	164.00	1	0	
RFT-04-89	12	Hoosier Prairie	F fodiens	1	m2	24.93	1	1	0	0.0	1	0	25.0	16.50	20.30	0	0	
RFT-04-89	16	Hoosier Prairie	F fodiens	1	m2	21.38	1	1	0	0.0	1	0	25.0	38.00	45.70	1	1	
RFT-04-89	18	Hoosier Prairie	F fodiens	1	m2	24.09	1	1	1	44.5	1	0	22.0	44.50	44.50	0	0	
RFT-04-89	21	Hoosier Prairie	F fodiens	1	m2	15.99	1	1	0	0.0	1	0	15.9	52.70	52.70	0	0	
RFT-04-89	23	Hoosier Prairie	F fodiens	1	m2	19.84	1	1	1	1.3	1	0	22.2	43.20	43.20	0	0	
TS0401	2	Twin Swamp	F fodiens	1	m2	21.60	1	1	1	7.5	1	0		10.00	25.00	1	1	
TS0401	4	Twin Swamps	F fodiens	1	m2	22.59	1	3	2	3.9	1	0	20.0	32.00	53.00	1	1	
TS0401	5	Twin Swamps	F fodiens	1	m2	24.12	1	2	1	9.0	0	0	30.0	13.50	27.00	1	1	
TS0401	7	Twin Swamps	F fodiens	1	m2	23.01	1	2	2	8.5	0	0	25.0	13.50		1	1	
TS0401	9	Twin Swamps	F fodiens	1	m2	30.56	1	2	2	3.0	1	0	25.0	15.00	54.00	0	1	
RFT-04-44	5	Twin Swamps	F fodiens	1	m2	20.11	1	1	1	7.5	1	0	18.0	91.50	91.50	1	1	
BBB05-08	8	Bean Blossom Bottom	F fodiens	1			1	2	1	5.0	0	0	35.0	48.00	76.00	0	0	
BBB0528	28	Bean Blossom Bottom	F fodiens	1			1	3	1	45.0	1	0	55.0	80.00	150.00	0	0	
BBB0529	29	Bean Blossom Bottom	F fodiens	1			1	2	2	55.0	2	0	60.0	40.00	115.00	0	0	
BBB0530	30	Bean Blossom Bottom	F fodiens	1			1	1	1	40.0	0	0	30.0	40.00	110.00	0	0	
BBB0536	36	Bean Blossom Bottom	F fodiens	1			1	1	1	65.0	1	0	40.0	70.00	70.00	0	0	

Table C-3. Morphology of burrows cont.																		
Name	**Burrow number**	**Water body**	**individual**	**No. individ.**	**Sex**	**carapace length**	**active**	**# entrances**	**chimneys**	**chim heigth mm**	**surface plugs**	**sub-surface plugs**	**entr diam. mm**	**water depth cm**	**burrow depth cm**	**laterals**	**chamber**	**notes**
BBB0537	37	Bean Blossom Bottom	F fodiens	1			1	1	1	95.0	1	0	25.0	68.00	140.00	0	0	
RFT-04-87	2	Twin Swamps	F fodiens	1			1	1	1	5.1	1	1	25.0	68.60	68.60	1	0	secondary plug 15.2 cm
PNP0626	26	Potowatomi Nat Pres	C polychromatus	1	?	44.00	1	1	0	0.0	0	0	30.0	16.00	70.00	0	1	
SL06025	25	Summit Lake	C polychromatus	1	?		1	2	1	6.6	1	0	32.0	75.00	100.00			observed w/ scope
FT06045	45	Falling Timber	C polychromatus	1	f	51.49	0	2	0	0.0	0	0	37.0	50.00	85.00	0	0	
FT06001	1	Falling Timber	C polychromatus	1	f	31.12	1	1	1	6.4	1	0	38.0	38.00	42.00	1	1	
FT06002	2	Falling Timber	C polychromatus	1	f	33.26	1	1	1	9.7	1	0	31.0	35.00	60.00	0	0	
FT06003	3	Falling Timber	C polychromatus	1	f	32.35	1	1	1	4.5	0	0	35.0					
FT06006	6	Falling Timber	C polychromatus	1	f	34.84	1	4	3	5.0	3	0	37.0	33.00	74.00	2	2	
FT06014	14	Falling Timber	C polychromatus	1	f	32.65	1	1	1	4.6	1	0	38.0	15.00	65.00	2	2	
FT06016	16	Falling Timber	C polychromatus	1	f	43.63	1	2	1	2.4	1	0	52.0	35.00	52.00	0	1	
FT06018	18	Falling Timber	C polychromatus	1	f	40.15	1	2	2	3.0	1	0	36.0	40.00	80.00	1	1	
FT06020	20	Falling Timber	C polychromatus	1	f	38.85	1	2	0	0.0	1	0	35.0	47.00	47.00	1	0	
PNP0602	2	Potowatomi Nat Pres	C polychromatus	1	f	34.44	1	2	2	7.5	1	0	35.0	57.00	80.00	1	1	
PNP0629	29	Potowatomi Nat Pres	C polychromatus	1	f	41.75	1	1	0	0.0	0	0	35.0	90.00	108.00	0	1	

Table C-3. Morphology of burrows cont.

Name	Burrow number	Water body	individual	No. individ.	Sex	carapace length	active	# entrances	chimneys	chim heigth mm	surface plugs	sub-surface plugs	entr diam. mm	water depth cm	burrow depth cm	laterals	chamber	notes
PNP0630	30	Potowatomi Nat Pres	C polychromatus	1	f	45.28	1	1	0	0.0	0	0	35.0	100.00	102.00	0	1	
SL06001	1	Summit Lake	C polychromatus	1	f	41.92	1	3	2	7.0	1	0	42.0	0.00	92.00	2	0	
SL06003	3	Summit Lake	C polychromatus	1	f	46.00	1	4	3	5.2	3	0	45.0	0.00	100.00	2	0	
SL06005	5	Summit Lake	C polychromatus	1	f	24.09	1	1	1	4.8	1	0	20.0	20.00	100.00	0	0	
SL06007	7	Summit Lake	C polychromatus	1	f	26.41	1	2	1	4.5	2	0	22.0	0.00	74.00	1	0	
SL06013	13	Summit Lake	C polychromatus	1	f	44.48	1	2	2	6.5	2	0	50.0	60.00	157.00	1	0	
SL0631	31	Summit Lake	C polychromatus	1	f	58.23	1	1	0	0.0	0	0	43.0	67.00	94.00	0	1	
SL0635	35	Summit Lake	C polychromatus	1	f	54.07	1	2	1	4.0	0	0	50.0	40.00	73.00	1	1	
RFT-04-46	2	Turkey Run	C polychromatus	1	f	32.72	1	2	1	5.0	1	0				1	0	
RFT-04-46	11	Turkey Run	C polychromatus	1	f	25.58	1	1	1	7.0	0	0	25.0	20.00	45.00	0	0	
TR0502	2	Turkey Run	C polychromatus	1	f	25.83	1	2	1	5.4	1	0	25.0	0.00	26.00	0	0	
FT06042	42	Falling Timber	C polychromatus	1	m1	41.28	1	1	0	0.0	0	0	42.0	30.00	106.00	0	1	
PNP0607	7	Potowatomi Nat Pres	C polychromatus	1	m1	45.26	1	1	0	0.0	0	0	38.0	30.00	54.00	2	1	
PNP0633	33	Potowatomi Nat Pres	C polychromatus	1	m1	34.70	1	1	0	0.0	0	1	30.0	95.00	100.00	0	1	plug 80mm deep
PNP0634	34	Potowatomi Nat Pres	C polychromatus	1	m1	41.52	1	1	0	0.0	0	0	37.0	93.00	105.00	0	1	

Table C-3. Morphology of burrows cont.																		
Name	**Burrow number**	**Water body**	**individual**	**No. individ.**	**Sex**	**carapace length**	**active**	**# entrances**	**chimneys**	**chim heigth mm**	**surface plugs**	**sub-surface plugs**	**entr diam. mm**	**water depth cm**	**burrow depth cm**	**laterals**	**chamber**	**notes**
PNP0638	38	Potowatomi Nat Pres	C polychromatus	1	m1	52.10	1	2	0	0.0	1	0	45.0	100.00	120.00	1	1	
SL0630	30	Summit Lake	C polychromatus	1	m1	44.87	1	2	0	0.0	0	0	36.0	58.00	97.00	1	1	
SL0634	34	Summit Lake	C polychromatus	1	m1	42.93	1	1	0	0.0	0	0	42.0	50.00	110.00	0	0	
FT06010	10	Falling Timber	C polychromatus	1	m2	38.47	1	3	3	7.0	0	0	37.0	50.00	50.00	2	1	
PNP0603	3	Potowatomi Nat Pres	C polychromatus	1	m2	41.82	1	1	1	2.3	0	0	35.0	15.00	50.00	0	1	
PNP0604	4	Potowatomi Nat Pres	C polychromatus	1	m2	32.94	1	3	1	4.0	2	0	26.0	38.00	71.00	1	1	
PNP0605	5	Potowatomi Nat Pres	C polychromatus	1	m2	41.30	1	3	2	3.0	2	0	42.0	50.00	69.00	1	1	
PNP0609	9	Potowatomi Nat Pres	C polychromatus	1	m2	35.17	1	3	2	5.5	2	0	30.0	72.00	72.00	0	1	
PNP0610	10	Potowatomi Nat Pres	C polychromatus	1	m2	45.00	1	2	1	3.0	1	0	37.0	58.00	72.00	1	1	returned to burrow
PNP0631	31	Potowatomi Nat Pres	C polychromatus	1	m2	41.37	1	1	0	0.0	0	0	40.0	90.00	90.00	0	1	
PNP0632	32	Potowatomi Nat Pres	C polychromatus	1	m2	37.22	1	1	0	0.0	0	0	30.0	88.00	91.00	1	1	
SL06002	2	Summit Lake	C polychromatus	1	m2	38.09	1	2	1	4.2	1	0	30.0	0.00	92.00	1	1	
SL06004	4	Summit Lake	C polychromatus	1	m2	47.63	1	4	2	9.0	2	0	58.0	0.00	100.00	0	0	
SL06006	6	Summit Lake	C polychromatus	1	m2	46.57	1	3	2	15.0	2	0	43.0	5.00	144.00	1	1	
SL06008	8	Summit Lake	C polychromatus	1	m2	44.40	1	3	2	6.4	2	0	46.0	0.00	160.00	2	0	

Table C-3. Morphology of burrows cont.																		
Name	**Burrow number**	**Water body**	**individual**	**No. individ.**	**Sex**	**carapace length**	**active**	**# entrances**	**chimneys**	**chim heigth mm**	**surface plugs**	**sub-surface plugs**	**entr diam. mm**	**water depth cm**	**burrow depth cm**	**laterals**	**chamber**	**notes**
SL06010	10	Summit Lake	C polychromatus	1	m2	41.16	1	3	2	6.0	2	0	50.0	18.00	75.00	1	0	
SL06011	11	Summit Lake	C polychromatus	1	m2	56.94	1	3	2	7.0	1	0	42.0	0.00	130.00	2	1	
SL06021	21	Summit Lake	C polychromatus	1	m2	51.20	1	1	0	0.0	0	1	50.0	100.00	154.00	1	0	
SL0637	37	Summit Lake	C polychromatus	1	m2	48.96	1	1	0	0.0	0	0	45.0	60.00	132.00	1	1	
RFT-04-46	1	Turkey Run	C polychromatus	1	m2	36.85	1	1	0	0.0	0	0				0	0	
TR0510	10	Turkey Run	C polychromatus	1	m2	47.10	1	5	1	3.0	0	0	45.0	31.20	100.00	2	0	
TR0503	3	Turkey Run	C polychromatus	1	ovig	36.30	1	1	1	5.0	0	0	40.0	38.50	63.00	0	0	198 eggs
BBB05-04	4	Bean Blossom Bottom	C polychromatus	1			1	2	1	14.5	1	0	40.0	53.00	120.00	0	0	
PNP0621	21	Potowatomi Nat Pres	C polychromatus				1	1	0	0.0	0	0	29.0	47.00	82.00	2	1	observed in burrow only
PNP0623	23	Potowatomi Nat Pres	C polychromatus	1			1	2	0	0.0	0	0	32.0	25.00	70.00			observe at entrance
BBB0539	39	Bean Blossom Bottom	C diogenes	1	f		0	2	1	12.0	1	0	60.0	60.00	168.00	0	0	
BFB0528	28	Bloomfield Barrens	C diogenes	1	f	59.39	0	2	1	16.0	1	0	45.0	140.00	200.00	1	0	
BFB0502	2	Bloomfield Barrens	C diogenes	1	f	56.00	1	3	1	18.5	0	0	75.0			2	1	
BFB0503	3	Bloomfield Barrens	C diogenes	1	f	55.16	1	3	1	14.5	1	0	45.0			2	1	
BFB0506	6	Bloomfield Barrens	C diogenes	1	f	39.81	1	4	1	19.0	0	0	35.0			1	1	
BFB0508	8	Bloomfield Barrens	C diogenes	1	f	26.67	1	1	1	13.0	0	0	30.0	15.00	70.00	0	0	
BFB0513	13a	Bloomfield Barrens	C diogenes	1	f	44.26	1	2	2	12.5	0	0	50.0	120.00	140.00	0	0	

Table C-3. Morphology of burrows cont.																		
Name	**Burrow number**	**Water body**	**individual**	**No. individ.**	**Sex**	**carapace length**	**active**	**# entrances**	**chimneys**	**chim heigth mm**	**surface plugs**	**sub-surface plugs**	**entr diam. mm**	**water depth cm**	**burrow depth cm**	**laterals**	**chamber**	**notes**
BFB0525	25	Bloomfield Barrens	C diogenes	1	f	55.93	1	1	1	11.0	1	0	60.0	90.00	90.00	0	0	
BFB0531	31	Bloomfield Barrens	C diogenes	1	f	46.36	1	6	3	16.5	1	0	30.0	100.00	108.00	2	0	
FT06040	40	Falling Timber	C diogenes	1	f	60.50	1	2	1	3.0	0	0	50.0	34.00				
FT06047	47	Falling Timber	C diogenes	1	f	52.01	1	1	0	0.0	0	0	42.0	60.00	102.00	0	0	
SL0639	39	Summit Lake	C diogenes	1	hermaphrodyte	55.09	0	1	0	0.0	0	0	40.0	63.00	130.00	1	1	
FT06046	46	Falling Timber	C diogenes	1	m1	50.68	0	2	0	0.0	0	0	50.0	85.00	99.00	0	0	
BBB0541	41	Bean Blossom Bottom	C diogenes	1	m1		1	2	1	8.5	1	0	50.0	50.00	145.00	0	0	
BBB0554	54	Bean Blossom Bottom	C diogenes	1	m1		1	1	1	9.0	0	0	45.0	65.00	130.00	0	0	
BBB0555	55	Bean Blossom Bottom	C diogenes	1	m1		1	2	0	0.0	0	0	55.0	75.00	160.00	0	1	
BFB0515	15	Bloomfield Barrens	C diogenes	1	m1	57.55	1	4	0	0.0	1	0	50.0	60.00	124.50	1	0	
BFB0530	30	Bloomfield Barrens	C diogenes	1	m1	53.44	1	1	1	8.0	0	0	55.0	200.00	200.00	0	0	
FT06013	13	Falling Timber	C diogenes	1	m1	59.50	1	1	1	4.4	0	0	72.0	50.00				
FT06017	17	Falling Timber	C diogenes	1	m1	51.93	1	2	1	9.0	1	0	5.0	50.00	70.00	3	3	
FT06041	41	Falling Timber	C diogenes	1	m1	52.67	1	2	0	0.0	0	0	60.0	50.00	120.00	1	1	
BFB0511	11a	Bloomfield Barrens	C diogenes	1	m2	28.22	1	2	2	12.0	1	1	21.0	50.00	50.00	0	0	
BFB0521	21	Bloomfield Barrens	C diogenes	1	m2		1	1	1	19.2	1	0	31.0	80.00	80.00	0	0	
FT06009	9	Falling Timber	C diogenes	1	m2	47.69	1	3	3	18.0	0	0	50.0	100.00	100.00	0	0	
FT06019	19	Falling Timber	C diogenes	1	m2	47.22	1	2	1	6.0	0	0	55.0	95.00	115.00	1	1	
BBB05-06	6	Bean Blossom Bottom	C diogenes	1			1	2	1	6.0	0	0	60.0	45.00	135.00	0	0	
FT06007	7	Falling Timber		1	f	28.91	1	2	2	8.5	2	0	26.0	50.00	65.00	1	1	
BBB0511	11	Bean Blossom Bottom		0			0	1	0	0.0	0	0	45.0	41.00	69.50	0	0	Wolf spider

Table C-3. Morphology of burrows cont.																		
Name	**Burrow number**	**Water body**	**individual**	**No. individ.**	**Sex**	**carapace length**	**active**	**# entrances**	**chimneys**	**chim heigth mm**	**surface plugs**	**sub-surface plugs**	**entr diam. mm**	**water depth cm**	**burrow depth cm**	**laterals**	**chamber**	**notes**
BBB0512	12	Bean Blossom Bottom		0			0	1	0	0.0	0	0	40.0	30.00	30.00	0	0	
BBB0513	13	Bean Blossom Bottom		0			0	1	1	30.0	0	0	75.0	40.00	75.00	0	0	
BBB0514	14	Bean Blossom Bottom		0			0	1	0	0.0	0	0	50.0	24.50	24.50	0	0	
BBB0515	15	Bean Blossom Bottom		0			0	1	0	0.0	0	0	45.0	27.50	27.50	0	0	
BBB0516	16	Bean Blossom Bottom		0			0	2	1	80.0	0	0	70.0	26.50	26.50	0	0	wolf spider
BBB0517	17	Bean Blossom Bottom		0			0	3	1	65.0	0	0	70.0	35.50	35.50	0	0	
BBB0518	18	Bean Blossom Bottom		0			0	1	1	40.0	0	0	60.0	37.50	68.50	0	0	wolf spider
BBB0519	19	Bean Blossom Bottom		0			0	1	0	0.0	0	0	40.0	25.50	25.50	0	0	
BBB0520	20	Bean Blossom Bottom		0			0	1	0	0.0	0	0	40.0	21.50	21.50	0	0	
BBB0523	23	Bean Blossom Bottom		0			0	1	0	0.0	0	0	30.0	50.00	60.00	0	0	
BBB0527	27	Bean Blossom Bottom		0			0	3	1	81.0	0	0	38.0			2	0	
BBB0531	31	Bean Blossom Bottom		0			0	2	1	60.0	1	0	45.0	100.00	110.00	0	0	
BBB0533	33	Bean Blossom Bottom		0			0	1	0	0.0	0	0	30.0	85.00	133.00	0	0	
BBB0542	42	Bean Blossom Bottom		0			0	1	1	16.0	1	0	40.0	40.00	145.00	0	0	
BBB0546	46	Bean Blossom Bottom		0			0	1	0	0.0	0	0	50.0	50.00	90.00	0	0	
BBB0556	56	Bean Blossom Bottom		0			0	3	1	4.0	1	0	55.0	65.00	200.00	0	1	
BBB0557	57	Bean Blossom Bottom		0			0	3	0	0.0	0	0	55.0	55.00	165.00	0	0	
BFB0511	11	Bloomfield Barrens		0			0	5	0	0.0	0	1	50.0	30.00	30.00	1	0	leopard frog
BFB0512	12	Bloomfield Barrens		0			0	3	0	0.0	0	0	33.0	50.00	50.00	0	0	mole cricket
BFB0513	13	Bloomfield Barrens		0			0	1	0	0.0	0	0	45.0	49.00	76.00	0	0	
BFB0514	14	Bloomfield Barrens		0			0	2	0	0.0	0	0	55.0	70.00	119.00	0	0	
BFB0524	24	Bloomfield Barrens		0			0	1	0	0.0	1	0	55.0					

Table C-3. Morphology of burrows cont.																		
Name	**Burrow number**	**Water body**	**individual**	**No. individ.**	**Sex**	**carapace length**	**active**	**# entrances**	**chimneys**	**chim heigth mm**	**surface plugs**	**sub-surface plugs**	**entr diam. mm**	**water depth cm**	**burrow depth cm**	**laterals**	**chamber**	**notes**
FT06004	4	Falling Timber		0			0	1	1	7.0	0	0	28.0					spider
FT06012	12	Falling Timber		0			0	1	0	0.0	0	0	60.0	34.00	50.00	1	1	
FT06015	15	Falling Timber		0			0	1	0	0.0	0	0	53.0	20.00	65.00	2	2	
FT06025	25	Falling Timber		0			0	1	0	0.0	0	0	46.0	35.00	55.00	0	0	
FT06026	26	Falling Timber		0			0	2	0	0.0	0	0	53.0	41.00	66.00	0	0	
FT06027	27	Falling Timber		0			0	2	0	0.0	0	1	78.0	44.00	44.00	0	0	
FT06030	30	Falling Timber		0			0	1	0	0.0	0	1	52.0	47.00	47.00	0	0	
FT06044	44	Falling Timber		0			0	2	0	0.0	0	0	50.0	40.00	73.00	1	0	
HP0503	3	Hoosier Prairie		0			0	1	0	0.0	0	0	45.0	16.00	32.00	0	0	disturbed by raccoon
HP0505	5	Hoosier Prairie		0			0	1	0	0.0	0	0	20.0	0.00	24.00	0	0	
HP0507	7	Hoosier Prairie		0			0	2	0	0.0	0	0	65.0	28.00	52.00	0	0	
HP0508	8	Hoosier Prairie		0			0	1	0	0.0	0	0	50.0	20.00	61.00	0	1	
HP0511	11	Hoosier Prairie		0			0	1	0	0.0	1	0	25.0	0.00	17.00	0	0	
HP0512	12	Hoosier Prairie		0			0	1	0	0.0	0	0	25.0	6.80	15.00	0	0	
HP0513	13	Hoosier Prairie		0			0	1	0	0.0	0	0	22.0	15.00	36.00	0	0	
HP0514	14	Hoosier Prairie		0			0	1	0	0.0	0	0	25.0	10.00	26.00	0	0	
RFT-04-45	6	Hoosier Prairie		0			0	1	0	0.0	1	0	15.0	25.00	25.00	0	0	
RFT-04-45	7	Hoosier Prairie		0			0	1	0	0.0	1	0	22.0	25.00	25.00	0	0	
RFT-04-45	9	Hoosier Prairie		0			0	1	1	3.0	0	0	23.0	26.00	27.00	0	0	
RFT-04-45	10	Hoosier Prairie		0			0	1	1	3.0	0	0	10.0	26.00	27.00	0	0	
RFT-04-45	13	Hoosier Prairie		0			0	1	0	0.0	1	0	20.0	15.00	28.00	1	1	
RFT-04-45	14	Hoosier Prairie		0			0	1	0	0.0	0	0	30.0	12.00	18.00	0	0	
RFT-04-45	15	Hoosier Prairie		0			0	1	0	0.0	0	0	40.0	15.00	15.00	0	0	
RFT-04-45	19	Hoosier Prairie		0			0	1	0	0.0	0	0	45.0	18.00	36.00	0	0	
RFT-04-89	1	Hoosier Prairie		0			0	1	0	0.0	0	0	57.0	28.00	28.00	0	0	
RFT-04-89	6	Hoosier Prairie		0			0	1	0	0.0	0	0	38.0	30.50	30.50	0	0	
RFT-04-89	7	Hoosier Prairie		0			0	1	0	0.0	0	0	25.0	27.90	27.90	0	0	
RFT-04-89	9	Hoosier Prairie		0			0	1	0	0.0	0	0	25.0	25.50	25.50	0	0	
RFT-04-89	10	Hoosier Prairie		0			0	1	0	0.0	0	0	25.0	20.30	20.30	0	0	
RFT-04-89	22	Hoosier Prairie		0			0	1	0	0.0	0	0	31.7	31.70	31.70	0	0	
RFT-04-89	24	Hoosier Prairie		0			0	1	0	0.0	0	0	31.7	43.20	43.20	0	0	
SL06003	3a	Summit Lake		0			0	1	0	0.0	0	1	40.0	120.00	120.00	0	0	plug 27 cm down
SL06020	20	Summit Lake		0			0	1	0	0.0	0	0	47.0	85.00	123.00	0	1	
SL06022	22	Summit Lake		0			0	1	0	0.0	0	0	60.0	64.00	90.00	0	0	
SL06023	23	Summit Lake		0			0	1	0	0.0	0	0	50.0	68.00	132.00	0	0	
RFT-04-46	7	Turkey Run		0			0	1	0	0.0	0	0	30.0	15.00	22.00	0	0	
RFT-04-46	8	Turkey Run		0			0	1	1	8.0	0	0	30.0	60.00	60.00	0	0	
RFT-04-46	9	Turkey Run		0			0	1	1	9.0	0	0	25.0	1.00		0	0	

Table C-3. Morphology of burrows cont.																		
Name	**Burrow number**	**Water body**	**individual**	**No. individ.**	**Sex**	**carapace length**	**active**	**# entran ces**	**chimn eys**	**chim heigth mm**	**surface plugs**	**sub-surface plugs**	**entr diam. mm**	**water depth cm**	**burrow depth cm**	**laterals**	**cham ber**	**notes**
RFT-04-46	10	Turkey Run		0			0	2	1	4.0	0	0	30.0	30.00	50.00	0	0	
RFT-04-46	12	Turkey Run		0			0	1	0	0.0	0	0	20.0					
RFT-04-88	3	Turkey Run		0			0	1	0	0.0	0	0		5.10	40.60	0	1	
RFT-04-88	13	Turkey Run		0			0	1	0	0.0	0	0	32.0	15.00	40.60	1	1	
RFT-04-88	17	Turkey Run		0			0	1	0	0.0	0	0	25.0	61.00	61.00	0	0	
RFT-04-88	18	Turkey Run		0			0	1	0	0.0	0	0	25.0	33.00	35.50	1	0	
RFT-04-88	19	Turkey Run		0			0	1	0	0.0	0	0	38.0	61.00	61.00	1	0	
RFT-04-88	22	Turkey Run		0			0	1	1	5.1	0	0	51.0	66.00	89.00	0	1	
TR0506	6	Turkey Run		0			0	2	0	0.0	0	0	65.0	0.00	24.00	0	0	
TR0509	9	Turkey Run		0			0	1	0	0.0	0	0	35.0	0.00	100.00	0	0	
TS0401	11	Twin Swamps		0			0	2	0	0.0	0	0	34.0	33.00	52.50	0	1	
TS0401	12	Twin Swamps		0			0	1	0	0.0	0	0	30.0	32.40	32.40	0	1	
TS0401	13	Twin Swamps		0			0	1	0	0.0	0	0	40.0	32.50	32.50	0	1	
RFT-04-87	5	Twin Swamps		0			0	1	0	0.0	0	0	25.0	35.60	35.60	0	0	
RFT-04-87	12	Twin Swamps		0			0	1	1	4.4	0	0	22.0	35.50	35.50	0	0	lots of debris
RFT-04-87	13	Twin Swamps		0			0	1	1	1.3	0	0	38.0	63.50	63.50	0	0	lots of debris
BBB05-01	1	Bean Blossom Bottom		0			1	3	1	6.0	0	0	35.0	71.00	100.00	1	0	
BBB05-02	2	Bean Blossom Bottom		0			1	1	1	9.0	0	0	35.0	42.00	103.00	0	0	
BBB05-03	3	Bean Blossom Bottom		0			1	2	0	0.0	0	0	50.0	75.00	135.00	0	0	
BBB05-05	5	Bean Blossom Bottom		0			1	1	1	60.0	0	0	38.0	37.00	89.00	0	0	
BBB05-07	7	Bean Blossom Bottom		0			1	1	1	7.0	0	0	50.0	22.00	59.00	0	0	
BBB05-09	9	Bean Blossom Bottom		0			1	1	1	65.0	0	0	40.0	45.00	54.00	0	0	
BBB0521	21	Bean Blossom Bottom		0			1	1	1	68.0	1	0	21.0	60.00	140.00	0	0	
BBB0522	22	Bean Blossom Bottom		0			1	1	1	49.0	1	0	45.0	75.00	85.00	0	0	
BBB0524	24	Bean Blossom Bottom		0			1	2	1	43.0	0	0	25.0	85.00	90.00	0	0	
BBB0525	25	Bean Blossom Bottom		0			1	1	1	30.0	0	0	24.0	80.00	105.00	0	0	
BBB0526	26	Bean Blossom Bottom		0			1	2	1	150.0	1	0	70.0	75.00	120.00	0	0	
BBB0532	32	Bean Blossom Bottom		0			1	1	0	0.0	0	0	40.0	65.00	80.00	0	0	

Table C-3. Morphology of burrows cont.																		
Name	Burrow number	Water body	individual	No. individ.	Sex	carapace length	active	# entrances	chimneys	chim heigth mm	surface plugs	sub-surface plugs	entr diam. mm	water depth cm	burrow depth cm	laterals	chamber	notes
BBB0534	34	Bean Blossom Bottom		0			1	3	3	93.0	3	0	50.0	85.00	125.00	0	0	
BBB0535	35	Bean Blossom Bottom		0			1	1	1	70.0	1	0	30.0	100.00	165.00	0	0	
BBB0538	38	Bean Blossom Bottom		0			1	2	1	45.0	1	0	40.0	90.00	150.00	0	0	
BBB0550	50	Bean Blossom Bottom		0			1	1	1	6.0	0	0	40.0	45.00	209.00	0	0	
BBB0553	53	Bean Blossom Bottom		0			1	2	1	20.0	1	0	50.0	65.00	143.00	0	0	
BBB0558	58	Bean Blossom Bottom		0			1	1	0	0.0	0	0	45.0	60.00	150.00	0	0	
BFB0501	1	Bloomfield Barrens		0			1	2	1	6.5	0	0	55.0	64.00	98.50	1	1	
BFB0504	4	Bloomfield Barrens		0			1	2	1	13.4	1	0	32.0			1	1	
BFB0505	5	Bloomfield Barrens		0			1	2	1	4.7	1		42.0			1	2	
BFB0507	7	Bloomfield Barrens		0			1	1	1	12.0	0	0	40.0			0	0	
BFB0519	19a	Bloomfield Barrens		0			1	1	1	8.8	0	0	70.0	220.00	230.00	1	1	
BFB0512	12a	Bloomfield Barrens		0			1	2	1	17.0	0	0	53.0	120.00	130.00	0	0	camel cricket
BFB0514	14a	Bloomfield Barrens		0			1	3	1	17.0	0	1	30.0	30.00	30.00	0	0	
BFB0515	15a	Bloomfield Barrens		0			1	3	1	20.0	1	1	40.0	145.00	145.00	0	0	
BFB0517	17	Bloomfield Barrens		0			1	1	1	8.2	1	0	25.0	155.00	155.00	0	0	
BFB0518	18	Bloomfield Barrens		0			1	2	2	13.9	2	0	68.0					
BFB0519	19	Bloomfield Barrens		0			1	1	1	14.5	1	1	30.0	100.00	100.00	0	0	
BFB0520	20	Bloomfield Barrens		0			1	2	2	5.9	2	0	39.0	153.00	153.00	1	0	
BFB0520	20a	Bloomfield Barrens		0			1	2	2	3.0	1	1	45.0	115.00	120.00	0	1	
BFB0521	21a	Bloomfield Barrens		0			1	1	1	6.5	1		25.0					
BFB0522	22	Bloomfield Barrens		0			1	1	1	6.0	1	0	30.0	87.00	87.00	0	0	
BFB0523	23	Bloomfield Barrens		0			1	2	1	12.5	1	0	20.0	45.00	45.00	0	0	

Table C-3. Morphology of burrows cont.																		
Name	**Burrow number**	**Water body**	**individual**	**No. individ.**	**Sex**	**carapace length**	**active**	**# entrances**	**chimneys**	**chim heigth mm**	**surface plugs**	**sub-surface plugs**	**entr diam. mm**	**water depth cm**	**burrow depth cm**	**laterals**	**chamber**	**notes**
BFB0526	26	Bloomfield Barrens		0			1	2	1	9.5	2	0	20.0					
BFB0527	27	Bloomfield Barrens		0			1	1	1	12.0	1	0	30.0	60.00	60.00	1	0	
BFB0529	29	Bloomfield Barrens		0			1	2	1	8.5	1	0	45.0	90.00	100.00	0	0	
BFB0532	32	Bloomfield Barrens		0			1	3	2	12.0	1	0	30.0	75.00	75.00			
FT06005	5	Falling Timber		0			1	1	1	8.0	0	0	34.0	96.00	103.00	0	1	
FT06008	8	Falling Timber		0			1	1	1	11.3	0	0	34.0	20.00	25.00	0	1	
FT06011	11	Falling Timber		0			1	3	1	5.0	2	0	50.0	40.00				
FT06021	21	Falling Timber		0			1	3	0	0.0	0	1	45.0					
FT06022	22	Falling Timber		0			1	1	0	0.0	0	1	43.0	110.00	110.00	0	1	
FT06023	23	Falling Timber		0			1	2	0	0.0	1	1	35.0	70.00	70.00			
FT06024	24	Falling Timber		0			1	1	0	0.0	0	1	30.0	30.00	30.00			
FT06029	29	Falling Timber		0			1	1	0	0.0	0	0	26.0	41.00	41.00	0	0	
FT06031	31	Falling Timber		0			1	2	0	0.0	0	0	55.0	75.00	86.00	1	1	
FT06032	32	Falling Timber		0			1	1	0	0.0	0	0	31.0	85.00	85.00	1	1	
FT06033	33	Falling Timber		0			1	1	0	0.0	0	0	56.0	60.00	100.00	1	1	
FT06034	34	Falling Timber		0			1	1	0	0.0	0	0	58.0	75.00	85.00	1	1	
FT06035	35	Falling Timber		0			1	1	0	0.0	0	0	45.0	50.00	123.00	0	0	
FT06036	36	Falling Timber		0			1	1	0	0.0	0	0	40.0	37.00	37.00			
FT06037	37	Falling Timber		0			1	2	0	0.0	0	0	50.0	60.00	60.00	0	0	
FT06038	38	Falling Timber		0			1	1	0	0.0	0	0	43.0	61.00	74.00	0	0	
FT06039	39	Falling Timber		0			1	1	0	0.0	0	0	50.0	60.00	93.00	0	0	
FT06043	43	Falling Timber		0			1	1	0	0.0	0	0	30.0	56.00	101.00	0	1	
FT06048	48	Falling Timber		0			1	1	0	0.0	0	0	35.0	37.00	85.00	0	0	
RFT-04-45	16	Hoosier Prairie		0			1	1	0	0.0	1	0	25.0	40.00	50.50	0	0	
RFT-04-45	17	Hoosier Prairie		0			1	1	1	5.0	1	0	22.0	12.00	43.00	0	1	
RFT-04-45	20	Hoosier Prairie		0			1	1	0	0.0	1	0	35.0	32.50	57.00	1	1	
RFT-04-89	11	Hoosier Prairie		0			1	1	0	0.0	1	0	19.0	38.00	38.00	0	0	
RFT-04-89	15	Hoosier Prairie		0			1	1	1	3.8	0	0	19.0	57.20	61.00	3	0	
RFT-04-89	17	Hoosier Prairie		0			1	1	1	25.0	1	0	13.0	25.40	25.40	0	0	
PNP0601	1	Potowatomi Nat Pres		0			1	1	1	2.0	1	0	30.0	73.00	73.00	2	1	
PNP0606	6	Potowatomi Nat Pres		0			1	1	1	7.5	0	0	50.0	43.00	43.00	1	1	
PNP0608	8	Potowatomi Nat Pres		0			1	2	0	0.0	1	0	38.0	50.00	50.00	3	1	
PNP0611	11	Potowatomi Nat Pres		0			1	2	0	0.0	1	0	37.0	48.00	75.00	0	1	

Table C-3. Morphology of burrows cont.																		
Name	**Burrow number**	**Water body**	**individual**	**No. individ.**	**Sex**	**carapace length**	**active**	**# entrances**	**chimneys**	**chim heigth mm**	**surface plugs**	**sub-surface plugs**	**entr diam. mm**	**water depth cm**	**burrow depth cm**	**laterals**	**chamber**	**notes**
PNP0612	12	Potowatomi Nat Pres		0			1	3	1	0.0	1	0	40.0	70.00	136.00	0	1	
PNP0613	13	Potowatomi Nat Pres		0			1	2	2	4.5	2	0	32.0	44.00	44.00	1	1	
PNP0614	14	Potowatomi Nat Pres		0			1	1	0	0.0	0	0	30.0	52.00	73.00	2	1	
PNP0615	15	Potowatomi Nat Pres		0			1	1	0	0.0	0	0	25.0	70.00	80.00	0	1	
PNP0616	16	Potowatomi Nat Pres		0			1	2	2	5.5	1	0	47.0	80.00	157.00	0	0	
PNP0617	17	Potowatomi Nat Pres		0			1	2	2	8.0	1	0	24.0					unpumpable
PNP0618	18	Potowatomi Nat Pres		0			1	2	2	6.0	1	0	20.0					unpumpable
PNP0619	19	Potowatomi Nat Pres		0			1	1	0	0.0	0	0	33.0			0	1	
PNP0620	20	Potowatomi Nat Pres		0			1	1	0	0.0	0	0	30.0					
PNP0622	22	Potowatomi Nat Pres		0			1	1	1	2.0	0	0	28.0	61.00	77.00	0	1	
PNP0624	24	Potowatomi Nat Pres		0			1	1	0	0.0	0	0	34.0	50.00	69.00	1	1	
PNP0625	25	Potowatomi Nat Pres		0			1	2	1	2.0	1	0	40.0	26.00	74.00			
PNP0627	27	Potowatomi Nat Pres		0			1	2	1	4.2	1	0	48.0	150.00	150.00	0	0	`
PNP0628	28	Potowatomi Nat Pres		0			1	2	1	3.0	1	0	50.0	65.00	65.00	0	0	wood frog
PNP0635	35	Potowatomi Nat Pres		0			1	1	0	0.0	0	0	30.0	75.00	95.00	2	0	
PNP0636	36	Potowatomi Nat Pres		0			1	1	1	6.5	0	0	25.0					
PNP0637	37	Potowatomi Nat Pres		1			1	1	0	0.0	0	0	47.0	90.00	90.00	0	0	
PNP0639	39	Potowatomi Nat Pres		0			1	1	1	7.3	0	0	35.0	106.00	106.00	0	0	
SL06009	9	Summit Lake		0			1	4	4	6.2	2	0	45.0	5.00	140.00	3	1	
SL06012	12	Summit Lake		0			1	1	1	5.0	1	0	40.0	40.00	90.00	1	1	
SL06014	14	Summit Lake		0			1	1	0	0.0	0	1	50.0	128.00	128.00	1	1	
SL06015	15	Summit Lake		0			1	1	0	0.0	0	1	30.0	90.00	90.00	0	0	
SL06016	16	Summit Lake		0			1	1	1	3.0	0	1	26.0	90.00	90.00	0	0	
SL06017	17	Summit Lake		0			1	2	1	11.5	1	0	40.0	45.00	66.00	4	2	at lake edge

Table C-3. Morphology of burrows cont.																		
Name	Burrow number	Water body	individual	No. individ.	Sex	carapace length	active	# entrances	chimneys	chim heigth mm	surface plugs	sub-surface plugs	entr diam. mm	water depth cm	burrow depth cm	laterals	chamber	notes
SL06018	18	Summit Lake		0			1	1	1	4.4	0	0	35.0	84.00	87.00	1	1	
SL06019	19	Summit Lake		0			1	1	0	0.0	0	0	30.0	80.00	153.00	0	0	
SL06024	24	Summit Lake		0			1	1	0	0.0	0	0	33.0	75.00	75.00			
SL06026	26	Summit Lake		0			1	1	0	0.0	0	0	31.0	75.00	110.00	1	0	
SL06027	27	Summit Lake		0			1	2	1	7.0	1	0	40.0	95.00	130.00	1	1	
SL0628	28	Summit Lake		0			1	1	0	0.0	0	0	47.0	83.00	83.00	1	1	garter snake
SL0629	29	Summit Lake		0			1	1	0	0.0	0	0	48.0	60.00	106.00	0	1	
SL0632	32	Summit Lake		0			1	3	0	0.0	0	0	45.0	55.00	107.00	0	1	
SL0633	33	Summit Lake		0			1	1	0	0.0	0	0	35.0	60.00	88.00	0	0	
SL0636	36	Summit Lake		0			1	1	0	0.0	0	0	36.0	60.00	103.00	0	0	
SL0638	38	Summit Lake		0			1	1	0	0.0	0	0	49.0	57.00	107.00	1	1	
RFT-04-46	3	Turkey Run		0			1	2	0	0.0	0	0	30.0	29.00	50.00	3	0	
RFT-04-46	4	Turkey Run		0			1	1	3	8.0	1	0	35.0	33.00	56.00	3	0	
RFT-04-46	5	Turkey Run		0			1	1	0	0.0	0	0	30.0	48.00	69.00	0	0	
RFT-04-46	6	Turkey Run		0			1	2	1	6.0	0	0	30.0	29.00	60.00	3	0	
RFT-04-88	4	Turkey Run		0			1	1	0	0.0	0	0	30.0	33.00	40.60	3	0	
RFT-04-88	5	Turkey Run		0			1	1	0	0.0	1	0	44.0	35.70	48.30	0	0	
RFT-04-88	6	Turkey Run		0			1	1	0	0.0	1	0	32.0	25.00	38.00	0	0	
RFT-04-88	8	Turkey Run		0			1	1	0	0.0	0	1	32.0	28.00	28.00	0	0	
RFT-04-88	10	Turkey Run		0			1	1	0	0.0	0	1	35.0	23.00	23.00	0	0	
RFT-04-88	14	Turkey Run		0			1	1	0	0.0	0	0	25.0	30.50	34.00	0	0	
RFT-04-88	15	Turkey Run		0			1	1	0	0.0	0	0	32.0	42.00	52.00	0	1	
RFT-04-88	16	Turkey Run		0			1	1	0	0.0	0	0	35.0	33.00	53.00	0	0	
RFT-04-88	20	Turkey Run		0			1	2	1	4.5	0	0	51.0	35.50	73.50	3	1	
TR0501	1	Turkey Run		0			1	2	1	9.5	1	0	50.0	0.00	38.50	1	1	
TR0504	4	Turkey Run		0			1	1	0	0.0	0	0	33.0	38.00	55.50	0	0	
TR0505	5	Turkey Run		0			1	1	0	0.0	0	0	40.0	25.00	59.00	1	0	
TR0507	7	Turkey Run		0			1	1	0	0.0	0	0	40.0	23.00	87.00	0	0	
TR0508	8	Turkey Run		0			1	1	1	7.0	0	0	20.0	0.00	48.00	0	0	
RFT-04-87	1	Twin Swamps		1			1	1	2	5.1	1	1	19.0	68.60	68.60	0	0	secondary plug20.3
RFT-04-87	4	Twin Swamps		0			1	1	1	3.8	1	0	25.0	68.60	68.60	0	0	
RFT-04-87	6	Twin Swamps		0			1	1	1	7.0			15.9					un-scopeable / not pumped
RFT-04-87	7	Twin Swamps		0			1	1	1	8.9			25.0					un-scopeable / not pumped

Table C-3. Morphology of burrows cont.																		
Name	**Burrow number**	**Water body**	**individual**	**No. individ.**	**Sex**	**carapace length**	**active**	**# entrances**	**chimneys**	**chim heigth mm**	**surface plugs**	**sub-surface plugs**	**entr diam. mm**	**water depth cm**	**burrow depth cm**	**laterals**	**chamber**	**notes**
RFT-04-87	8	Twin Swamps		0			1	1	1	5.1	1	0	47.6	88.90	88.90	0	0	
RFT-04-87	11	Twin Swamps		1			1	1	1	11.4	1	0	28.0	81.30	81.30	0	0	
RFT-04-87	14	Twin Swamps		0			1	0	0	0.0	0	0	25.0	35.50	35.50	0	0	lots of debris
RFT-04-44	2	Twin Swamps		0			1	1	1	9.2	1	0	15.0	45.00	45.00	0	0	
RFT-04-44	3	Twin Swamps		0			1	1	1	6.5	1	0	35.0	91.50	137.50	0	0	
RFT-04-44	4	Twin Swamps		0			1	1	1	10.5	1	0	20.0	91.50	91.50	0	0	
RFT-04-44	8	Twin Swamps		0			1	1	1	6.0	0	0	14.0	30.00	30.00	0	0	
RFT-04-44	11	Twin Swamps		0			1	1	0	0.0	0	1	25.0	91.50	91.50			un-pumpable
RFT-04-44	12	Twin Swamps		0			1	1	1	13.0	1	0	18.0	61.00	61.00			un-pumpable
						Total/ave	**269.00**	1.52	0.75	8.19	0.51	0.07	36.96	51.38	79.25	0.45	0.34	

Table C-4. Non crayfish burrow co-inhabitants recovered from crayfish burrows examined during this study.									
Site name	**Burrow name**	**Organism**	**Number**	**Scientific name**	**Class**	**Order**	**Family**	**Comment**	**Group totals**
Twin Swamps	TS0503	Branchiobdellid	2		Annelida	Oligochaeta	Branchiobdellidae		
Twin Swamps	TS0507	Branchiobdellid	2		Annelida	Oligochaeta	Branchiobdellidae		
Twin Swamps	TS0508	Branchiobdellid	11		Annelida	Oligochaeta	Branchiobdellidae		
Bloomfield Barrens	BFB0503	Branchiobdellid	10		Annelida	Oligochaeta	Branchiobdellidae		
Bloomfield Barrens	BFB0506	Branchiobdellid	13		Annelida	Oligochaeta	Branchiobdellidae		
Bloomfield Barrens	BFB0510	Branchiobdellid	5	Branchiobdellid	Annelida	Oligochaeta	Branchiobdellidae		
Bloomfield Barrens	BFB0515	Branchiobdellid	3		Annelida	Oligochaeta	Branchiobdellidae		
Bloomfield Barrens	BFB0511b	Branchiobdellid	5		Annelida	Oligochaeta	Branchiobdellidae		
Bloomfield Barrens	BFB0513b	Branchiobdellid	14		Annelida	Oligochaeta	Branchiobdellidae		
Bloomfield Barrens	BFB0516	Branchiobdellid	1		Annelida	Oligochaeta	Branchiobdellidae		
Bloomfield Barrens	BFB0521	Branchiobdellid	18		Annelida	Oligochaeta	Branchiobdellidae		
Bloomfield Barrens	BFB0525	Branchiobdellid	19		Annelida	Oligochaeta	Branchiobdellidae		
Bloomfield Barrens	BFB0528	Branchiobdellid	50		Annelida	Oligochaeta	Branchiobdellidae		
Bloomfield Barrens	BFB0530	Branchiobdellid	15		Annelida	Oligochaeta	Branchiobdellidae		
Bloomfield Barrens	BFB0531	Branchiobdellid	33		Annelida	Oligochaeta	Branchiobdellidae		
Bean Blossum Bottom	BBB0503	Branchiobdellid	1		Annelida	Oligochaeta	Branchiobdellidae		
Bean Blossum Bottom	BBB0530	Branchiobdellid	15		Annelida	Oligochaeta	Branchiobdellidae		
Bean Blossum Bottom	BBB0536	Branchiobdellid	4		Annelida	Oligochaeta	Branchiobdellidae		
Bean Blossum Bottom	BBB0539	Branchiobdellid	21		Annelida	Oligochaeta	Branchiobdellidae		
Bean Blossum Bottom	BBB0540	Branchiobdellid	2		Annelida	Oligochaeta	Branchiobdellidae		
Bean Blossum Bottom	BBB0541	Branchiobdellid	33		Annelida	Oligochaeta	Branchiobdellidae		
Bean Blossum Bottom	BBB0543	Branchiobdellid	2		Annelida	Oligochaeta	Branchiobdellidae		
Bean Blossum Bottom	BBB0544	Branchiobdellid	3		Annelida	Oligochaeta	Branchiobdellidae		
Bean Blossum Bottom	BBB0545	Branchiobdellid	3		Annelida	Oligochaeta	Branchiobdellidae		
Bean Blossum Bottom	BBB0547	Branchiobdellid	4		Annelida	Oligochaeta	Branchiobdellidae		
Bean Blossum Bottom	BBB0549	Branchiobdellid	4		Annelida	Oligochaeta	Branchiobdellidae		
Bean Blossum Bottom	BBB0551	Branchiobdellid	1		Annelida	Oligochaeta	Branchiobdellidae		
Bean Blossum Bottom	BBB0552	Branchiobdellid	1		Annelida	Oligochaeta	Branchiobdellidae		
Bean Blossum Bottom	BBB0554	Branchiobdellid	3		Annelida	Oligochaeta	Branchiobdellidae		
Fallin Timber	FT0625	Branchiobdellid	1		Annelida	Oligochaeta	Branchiobdellidae		
Fallin Timber	FT0648	Branchiobdellid	1		Annelida	Oligochaeta	Branchiobdellidae		300

Table C-4. Non crayfish burrow co-inhabitants continued.									
Site name	**Burrow name**	**Organism**	**Number**	**Scientific name**	**Class**	**Order**	**Family**	**Comment**	**Group totals**
Twin Swamps	RFT-04-44-11	earthworm	1		Annelida	Prosopora	Lumbriculidae		
Twin Swamps	RFT-04-44-3	earthworm	1		Annelida	Prosopora	Lumbriculidae		
Twin Swamps	RFT-04-44-5	earthworm	1		Annelida	Prosopora	Lumbriculidae		
Twin Swamps	RFT-04-87-3	earthworm	2		Annelida	Prosopora	Lumbriculidae		
Hoosier Prairie	RFT-04-89-24	earthworm	2		Annelida	Prosopora	Lumbriculidae		
Hoosier Prairie	RFT-04-89-5	earthworm	2		Annelida	Prosopora	Lumbriculidae		
Hoosier Prairie	HP200511	earthworm	1		Annelida	Prosopora	Lumbriculidae		
Bloomfield Barrens	BFB0511	earthworm	1		Annelida	Prosopora	Lumbriculidae		
Bloomfield Barrens	BFB0528	earthworm	1		Annelida	Prosopora	Lumbriculidae		
Bean Blossum Bottom	BBB0501	earthworm	1		Annelida	Prosopora	Lumbriculidae		
Bean Blossum Bottom	BBB0513	earthworm	1	Lumbricus tarrestrius	Annelida	Prosopora	Lumbriculidae		
Bean Blossum Bottom	BBB0514	earthworm	1	Lumbricus terrestrius	Annelida	Prosopora	Lumbriculidae		
Bean Blossum Bottom	BBB0517	earthworm	1		Annelida	Prosopora	Lumbriculidae		
Bean Blossum Bottom	BBB0546	earthworm	1		Annelida	Prosopora	Lumbriculidae		
Bean Blossum Bottom	BBB0547	earthworm	2		Annelida	Prosopora	Lumbriculidae		
Summit Lake	SL0622	earthworm	1		Annelida	Prosopora	Lumbriculidae		
Fallin Timber	FT0612	earthworm	1		Annelida	Prosopora	Lumbriculidae		321
Bean Blossum Bottom	BBB0516	wolf spider	1		Arachnida	Araneida	Lycosidae		
Bean Blossum Bottom	BBB0517	wolf spider	1		Arachnida	Araneida	Lycosidae		
Bean Blossum Bottom	BBB0519	wolf spider	1		Arachnida	Araneida	Lycosidae		3
Bean Blossum Bottom	BBB0501	Jumping spider	1		Arachnida	Araneida	Salticidae		
Turkey Run	RFT-04-88-16	spider	2		Arachnida	Araneida			
Twin Swamps	RFT-04-44-2	spider	1		Arachnida	Araneida			
Twin Swamps	RFT-04-87-12	spider	2		Arachnida	Araneida			
Twin Swamps	RFT-04-87-14	spider	1		Arachnida	Araneida			
Turkey Run	RFT-04-46-10	spider	2		Arachnida	Araneida			
Hoosier Prairie	RFT-04-89-21	spider	1		Arachnida	Araneida			
Hoosier Prairie	RFT-04-89-22	spider	1		Arachnida	Araneida			
Hoosier Prairie	HP200507	spider	1		Arachnida	Araneida			
Hoosier Prairie	HP200508	spider	1		Arachnida	Araneida			

Table C-4. Non crayfish burrow co-inhabitants continued.									
Site name	**Burrow name**	**Organism**	**Number**	**Scientific name**	**Class**	**Order**	**Family**	**Comment**	**Group totals**
Hoosier Prairie	HP200514	spider	1		Arachnida	Araneida			
Twin Swamps	TS0511	spider	1		Arachnida	Araneida			
Twin Swamps	TS0513	spider exuvia	1		Arachnida	Araneida			
Bloomfield Barrens	BFB0503	spider exuvia	1		Arachnida	Araneida			
Bloomfield Barrens	BFB0507	spider	2		Arachnida	Araneida			
Bloomfield Barrens	BFB0510	spider	1		Arachnida	Araneida			
Bloomfield Barrens	BFB0511	spider	1		Arachnida	Araneida			
Bloomfield Barrens	BFB0512	spider	1		Arachnida	Araneida			
Bloomfield Barrens	BFB0513b	spider	1		Arachnida	Araneida			
Bloomfield Barrens	BFB0528	spider	1		Arachnida	Araneida			
Bloomfield Barrens	BFB0532	spider leg	1		Arachnida	Araneida			
Bean Blossum Bottom	BBB0505	spider	1		Arachnida	Araneida			
Bean Blossum Bottom	BBB0511	spider	1		Arachnida	Araneida			
Bean Blossum Bottom	BBB0514	spider	1		Arachnida	Araneida			
Bean Blossum Bottom	BBB0515	spider	1		Arachnida	Araneida			
Bean Blossum Bottom	BBB0518	spider	1		Arachnida	Araneida			
Bean Blossum Bottom	BBB0520	spider	1		Arachnida	Araneida			
Bean Blossum Bottom	BBB0525	spider	1		Arachnida	Araneida			
Bean Blossum Bottom	BBB0526	spider	1		Arachnida	Araneida			
Bean Blossum Bottom	BBB0529	spider	1		Arachnida	Araneida			
Bean Blossum Bottom	BBB0533	spider	1		Arachnida	Araneida			
Bean Blossum Bottom	BBB0536	spider	1		Arachnida	Araneida			
Bean Blossum Bottom	BBB0547	spider	1		Arachnida	Araneida			
Bean Blossum Bottom	BBB0553	spider	2		Arachnida	Araneida			
Bean Blossum Bottom	BBB0554	spider	1	jumping	Arachnida	Araneida			
Bean Blossum Bottom	BBB0554	spider exuvia	1		Arachnida	Araneida			
Bean Blossum Bottom	BBB0556	spider	1		Arachnida	Araneida			
Bean Blossum Bottom	BBB0557	spider	1		Arachnida	Araneida			
Potowatami Nature Preserve	PNP0619	spider	1		Arachnida	Araneida			
Summit Lake	SL0603	spider	2		Arachnida	Araneida			
Summit Lake	SL0610	spider leg	1		Arachnida	Araneida			

Table C-4. Non crayfish burrow co-inhabitants continued.									
Site name	**Burrow name**	**Organism**	**Number**	**Scientific name**	**Class**	**Order**	**Family**	**Comment**	**Group totals**
Summit Lake	SL0614	spider	1		Arachnida	Araneida			
Summit Lake	SL0617	spider	1		Arachnida	Araneida			
Summit Lake	SL0618	spider	1		Arachnida	Araneida			
Summit Lake	SL0622	spider	1		Arachnida	Araneida			
Summit Lake	SL0623	spider body part	1		Arachnida	Araneida			
Summit Lake	SL0627	spider	1		Arachnida	Araneida			
Summit Lake	SL0629	spider	1		Arachnida	Araneida			
Summit Lake	SL0637	spider	2		Arachnida	Araneida			
Fallin Timber	FT0603	spider egg sack	1		Arachnida	Araneida			
Fallin Timber	FT0610	spider	1		Arachnida	Araneida			
Fallin Timber	FT0620	spider body part	1		Arachnida	Araneida			
Fallin Timber	FT0623	spider	1		Arachnida	Araneida			
Fallin Timber	FT0625	spider	3		Arachnida	Araneida			
Fallin Timber	FT0627	spider	1		Arachnida	Araneida			
Fallin Timber	FT0630	spider	1		Arachnida	Araneida			
Fallin Timber	FT0631	spider	2		Arachnida	Araneida			
Fallin Timber	FT0632	spider	1		Arachnida	Araneida			
Fallin Timber	FT0633	spider	2		Arachnida	Araneida			
Fallin Timber	FT0634	spider	1		Arachnida	Araneida			
Fallin Timber	FT0636	spider	1		Arachnida	Araneida			
Fallin Timber	FT0640	spider	1		Arachnida	Araneida			
Fallin Timber	FT0642	spider	2		Arachnida	Araneida			
Fallin Timber	FT0644	spider	1		Arachnida	Araneida			
Fallin Timber	FT0645	spider	1		Arachnida	Araneida			80
Hoosier Prairie	RFT-04-45-16	mite	1		Arachnida	Hydracarina			
Hoosier Prairie	RFT-04-45-8	mite	1		Arachnida	Hydracarina			
Hoosier Prairie	RFT-04-89-13	mite	1		Arachnida	Hydracarina			
Twin Swamps	RFT-04-87-5	mite	1		Arachnida	Hydracarina			
Turkey Run	RFT-04-46-9	mites	2		Arachnida	Hydracarina			
Hoosier Prairie	RFT-04-89-24	mite	1		Arachnida	Hydracarina			
Hoosier Prairie	HP200501	mite	1		Arachnida	Hydracarina			

Table C-4. Non crayfish burrow co-inhabitants continued.									
Site name	**Burrow name**	**Organism**	**Number**	**Scientific name**	**Class**	**Order**	**Family**	**Comment**	**Group totals**
Hoosier Prairie	HP200505	mite	1		Arachnida	Hydracarina			
Hoosier Prairie	HP200507	mite	2		Arachnida	Hydracarina			
Hoosier Prairie	HP200510	mite	1		Arachnida	Hydracarina			
Hoosier Prairie	HP200511	mite	1		Arachnida	Hydracarina			
Hoosier Prairie	HP200514	mite	1		Arachnida	Hydracarina			
Twin Swamps	TS0508	red mite	1		Arachnida	Hydracarina			
Twin Swamps	TS0511	mite	2		Arachnida	Hydracarina			
Twin Swamps	TS0513	mite	1		Arachnida	Hydracarina			
Turkey Run	TR0505	mite	1		Arachnida	Hydracarina			
Bloomfield Barrens	BFB0501	mite	2		Arachnida	Hydracarina			
Bloomfield Barrens	BFB0506	red mite	1		Arachnida	Hydracarina			
Bloomfield Barrens	BFB0507	mite	1		Arachnida	Hydracarina			
Bloomfield Barrens	BFB0507	mite	1		Arachnida	Hydracarina			
Bloomfield Barrens	BFB0513	mite	1		Arachnida	Hydracarina			
Bloomfield Barrens	BFB0514	mite	2		Arachnida	Hydracarina			
Bloomfield Barrens	BFB0511b	mite	1		Arachnida	Hydracarina			
Bloomfield Barrens	BFB0523	mite	1		Arachnida	Hydracarina			
Bloomfield Barrens	BFB0528	mite	2		Arachnida	Hydracarina			
Bean Blossum Bottom	BBB0503	red mite	1		Arachnida	Hydracarina			
Bean Blossum Bottom	BBB0507	mite	1		Arachnida	Hydracarina			
Bean Blossum Bottom	BBB0510	mite	1		Arachnida	Hydracarina			
Bean Blossum Bottom	BBB0511	red mite	1		Arachnida	Hydracarina			
Bean Blossum Bottom	BBB0511	mite	2		Arachnida	Hydracarina			
Bean Blossum Bottom	BBB0513	mite	1		Arachnida	Hydracarina			
Bean Blossum Bottom	BBB0514	mite	1		Arachnida	Hydracarina			
Bean Blossum Bottom	BBB0515	mite	1		Arachnida	Hydracarina			
Bean Blossum Bottom	BBB0516	mite	1		Arachnida	Hydracarina			
Bean Blossum Bottom	BBB0517	red mite	1		Arachnida	Hydracarina			
Bean Blossum Bottom	BBB0517	mite	1		Arachnida	Hydracarina			
Bean Blossum Bottom	BBB0521	mite	1		Arachnida	Hydracarina			
Bean Blossum Bottom	BBB0525	mite	1		Arachnida	Hydracarina			

Table C-4. Non crayfish burrow co-inhabitants continued.									
Site name	**Burrow name**	**Organism**	**Number**	**Scientific name**	**Class**	**Order**	**Family**	**Comment**	**Group totals**
Bean Blossum Bottom	BBB0526	mite	2		Arachnida	Hydracarina			
Bean Blossum Bottom	BBB0529	mite	1		Arachnida	Hydracarina			
Bean Blossum Bottom	BBB0537	mite	1		Arachnida	Hydracarina			
Bean Blossum Bottom	BBB0547	mite	1		Arachnida	Hydracarina			
Bean Blossum Bottom	BBB0553	mite	1		Arachnida	Hydracarina			
Bean Blossum Bottom	BBB0555	mite	1		Arachnida	Hydracarina			
Bean Blossum Bottom	BBB0556	mite	2		Arachnida	Hydracarina			
Potowatami Nature Preserve	PNP0601	mite	1		Arachnida	Hydracarina			
Potowatami Nature Preserve	PNP0607	mite	1		Arachnida	Hydracarina			
Potowatami Nature Preserve	PNP0610	mite	4		Arachnida	Hydracarina			
Potowatami Nature Preserve	PNP0613	mite	1		Arachnida	Hydracarina			
Potowatami Nature Preserve	PNP0615	mite	2		Arachnida	Hydracarina			
Potowatami Nature Preserve	PNP0620	mite	2		Arachnida	Hydracarina			
Potowatami Nature Preserve	PNP0622	mite	1		Arachnida	Hydracarina			
Potowatami Nature Preserve	PNP0630	mite	1		Arachnida	Hydracarina			
Potowatami Nature Preserve	PNP0637	mite	1		Arachnida	Hydracarina			
Summit Lake	SL0604	mite	3		Arachnida	Hydracarina			
Summit Lake	SL0613	mite	1		Arachnida	Hydracarina			
Summit Lake	SL0617	mite	1		Arachnida	Hydracarina			
Summit Lake	SL0618	mite	1		Arachnida	Hydracarina			
Summit Lake	SL0619	mite	2		Arachnida	Hydracarina			
Summit Lake	SL0620	mite	1		Arachnida	Hydracarina			
Summit Lake	SL0622	mite	3		Arachnida	Hydracarina			
Summit Lake	SL0623	mite	1		Arachnida	Hydracarina			
Summit Lake	SL0628	mite	1		Arachnida	Hydracarina			
Summit Lake	SL0631	mite	1		Arachnida	Hydracarina			
Summit Lake	SL0632	mite	1		Arachnida	Hydracarina			
Summit Lake	SL0633	mite	1		Arachnida	Hydracarina			
Summit Lake	SL0636	mite	1		Arachnida	Hydracarina			
Summit Lake	SL0637	mite	1		Arachnida	Hydracarina			
Fallin Timber	FT0604	mite	1		Arachnida	Hydracarina			

Table C-4. Non crayfish burrow co-inhabitants continued.									
Site name	**Burrow name**	**Organism**	**Number**	**Scientific name**	**Class**	**Order**	**Family**	**Comment**	**Group totals**
Fallin Timber	FT0627	mite	2		Arachnida	Hydracarina			
Fallin Timber	FT0635	mite	1		Arachnida	Hydracarina			
Fallin Timber	FT0637	mite	3		Arachnida	Hydracarina			94
Potowatami Nature Preserve	PNP0612	Phalangidae	1		Arachnida	Opiliones	Phalangidae		1
Bloomfield Barrens	BFB0528	psuedoscorpion	2		Arachnida	Pseudoscorpiones			
Summit Lake	SL0622	psuedoscorpion	1		Arachnida	Pseudoscorpiones			3/178
Summit Lake	SL0622	Polyphemus pediculus	1		Brachiopoda	Cladocera	Polyphemidae	accidental?	
Summit Lake	SL0623	Polyphemus pediculus	1		Brachiopoda	Cladocera	Polyphemidae	accidental?	
Summit Lake	SL0625	Polyphemus pediculus	1		Brachiopoda	Cladocera	Polyphemidae	accidental?	3
Hoosier Prairie	RFT-04-45-20	centipede	1		Chilopoda	Lithobiomorpha	Lithobidae		
Hoosier Prairie	RFT-04-89-10	centipede	1		Chilopoda	Lithobiomorpha	Lithobidae		
Twin Swamps	RFT-04-44-13	centapeid	1		Chilopoda	Lithobiomorpha	Lithobidae		
Twin Swamps	RFT-04-87-9	centipede	1		Chilopoda	Lithobiomorpha	Lithobidae		
Hoosier Prairie	RFT-04-89-24	centipede	1		Chilopoda	Lithobiomorpha	Lithobidae		
Bloomfield Barrens	BFB0502	centipede	1		Chilopoda	Lithobiomorpha	Lithobidae		
Bloomfield Barrens	BFB0512b	centipede	1		Chilopoda	Lithobiomorpha	Lithobidae		
Bean Blossum Bottom	BBB0538	centipede	1		Chilopoda	Lithobiomorpha	Lithobidae		
Summit Lake	SL0602	centipede	1		Chilopoda	Lithobiomorpha	Lithobidae		
Summit Lake	SL0610	centipede	1		Chilopoda	Lithobiomorpha	Lithobidae		
Fallin Timber	FT0604	centipeid	1		Chilopoda	Lithobiomorpha	Lithobidae		11
Hoosier Prairie	RFT-04-45-11	scud	1		Crustacea	Amphipoda	Gammadidae		
Hoosier Prairie	RFT-04-45-16	scud	2		Crustacea	Amphipoda	Gammadidae		
Hoosier Prairie	RFT-04-45-2	scud	1		Crustacea	Amphipoda	Gammadidae		
Hoosier Prairie	RFT-04-89-12	scud	1		Crustacea	Amphipoda	Gammadidae		
Twin Swamps	RFT-04-44-11	scud	1		Crustacea	Amphipoda	Gammadidae		
Twin Swamps	RFT-04-44-5	scud	1		Crustacea	Amphipoda	Gammadidae		
Twin Swamps	RFT-04-44-7	scud	1		Crustacea	Amphipoda	Gammadidae		
Twin Swamps	RFT-04-44-9	scud	1		Crustacea	Amphipoda	Gammadidae		
Twin Swamps	RFT-04-87-3	scud	1		Crustacea	Amphipoda	Gammadidae		
Hoosier Prairie	RFT-04-89-9	scud	2		Crustacea	Amphipoda	Gammadidae		
Hoosier Prairie	HP200502	scud	5		Crustacea	Amphipoda	Gammadidae		

Table C-4. Non crayfish burrow co-inhabitants continued.									
Site name	**Burrow name**	**Organism**	**Number**	**Scientific name**	**Class**	**Order**	**Family**	**Comment**	**Group totals**
Hoosier Prairie	HP200503	scud	21		Crustacea	Amphipoda	Gammadidae		
Hoosier Prairie	HP200506	scud	65		Crustacea	Amphipoda	Gammadidae		
Hoosier Prairie	HP200513	scud	43		Crustacea	Amphipoda	Gammadidae		
Hoosier Prairie	HP200514	scud	8		Crustacea	Amphipoda	Gammadidae		
Twin Swamps	TS0502	scud	1		Crustacea	Amphipoda	Gammadidae		
Twin Swamps	TS0503	scud	4		Crustacea	Amphipoda	Gammadidae		
Twin Swamps	TS0504	scud	1		Crustacea	Amphipoda	Gammadidae		
Twin Swamps	TS0506	scud	14		Crustacea	Amphipoda	Gammadidae		
Twin Swamps	TS0508	scud	7		Crustacea	Amphipoda	Gammadidae		
Twin Swamps	TS0509	scud	3		Crustacea	Amphipoda	Gammadidae		
Twin Swamps	TS0510	scud	3		Crustacea	Amphipoda	Gammadidae		
Twin Swamps	TS0511	scud	10		Crustacea	Amphipoda	Gammadidae		
Twin Swamps	TS0512	scud	2		Crustacea	Amphipoda	Gammadidae		
Twin Swamps	TS0513	scud	154		Crustacea	Amphipoda	Gammadidae		
Bloomfield Barrens	BFB0501	scud	3		Crustacea	Amphipoda	Gammadidae		
Bloomfield Barrens	BFB0502	scud	14		Crustacea	Amphipoda	Gammadidae		
Bloomfield Barrens	BFB0503	scud	2	Gammarus breviramus	Crustacea	Amphipoda	Gammadidae		
Bloomfield Barrens	BFB0508	scud	21		Crustacea	Amphipoda	Gammadidae		
Bloomfield Barrens	BFB0509	scud	1		Crustacea	Amphipoda	Gammadidae		
Bloomfield Barrens	BFB0510	scud	6		Crustacea	Amphipoda	Gammadidae		
Bloomfield Barrens	BFB0513	scud	1		Crustacea	Amphipoda	Gammadidae		
Bloomfield Barrens	BFB0514	scud	2		Crustacea	Amphipoda	Gammadidae		
Bloomfield Barrens	BFB0515	scud	2		Crustacea	Amphipoda	Gammadidae		
Bean Blossum Bottom	BBB0503	scud	7		Crustacea	Amphipoda	Gammadidae		
Bean Blossum Bottom	BBB0504	scud	15		Crustacea	Amphipoda	Gammadidae		
Bean Blossum Bottom	BBB0505	scud	18		Crustacea	Amphipoda	Gammadidae		
Bean Blossum Bottom	BBB0509	scud	2		Crustacea	Amphipoda	Gammadidae		
Bean Blossum Bottom	BBB0511	scud	2		Crustacea	Amphipoda	Gammadidae		
Bean Blossum Bottom	BBB0512	scud	1		Crustacea	Amphipoda	Gammadidae		
Bean Blossum Bottom	BBB0513	scud	15		Crustacea	Amphipoda	Gammadidae		
Bean Blossum Bottom	BBB0517	scud	13		Crustacea	Amphipoda	Gammadidae		

Table C-4. Non crayfish burrow co-inhabitants continued.									
Site name	**Burrow name**	**Organism**	**Number**	**Scientific name**	**Class**	**Order**	**Family**	**Comment**	**Group totals**
Bean Blossum Bottom	BBB0518	scud	40		Crustacea	Amphipoda	Gammadidae		
Bean Blossum Bottom	BBB0521	scud	1		Crustacea	Amphipoda	Gammadidae		
Bean Blossum Bottom	BBB0522	scud	1		Crustacea	Amphipoda	Gammadidae		
Bean Blossum Bottom	BBB0528	scud	1		Crustacea	Amphipoda	Gammadidae		
Bean Blossum Bottom	BBB0544	scud	1		Crustacea	Amphipoda	Gammadidae		
Bean Blossum Bottom	BBB0550	scud	1		Crustacea	Amphipoda	Gammadidae		
Potowatami Nature Preserve	PNP0607	scud	4		Crustacea	Amphipoda	Gammadidae		
Potowatami Nature Preserve	PNP0610	scud	2		Crustacea	Amphipoda	Gammadidae		
Potowatami Nature Preserve	PNP0611	scud	9		Crustacea	Amphipoda	Gammadidae		
Potowatami Nature Preserve	PNP0612	scud	5		Crustacea	Amphipoda	Gammadidae		
Potowatami Nature Preserve	PNP0613	scud	6		Crustacea	Amphipoda	Gammadidae		
Potowatami Nature Preserve	PNP0616	scud	3		Crustacea	Amphipoda	Gammadidae		
Potowatami Nature Preserve	PNP0623	scud	5		Crustacea	Amphipoda	Gammadidae		
Potowatami Nature Preserve	PNP0626	scud	1		Crustacea	Amphipoda	Gammadidae		
Potowatami Nature Preserve	PNP0629	scud	1		Crustacea	Amphipoda	Gammadidae		
Potowatami Nature Preserve	PNP0635	scud	1		Crustacea	Amphipoda	Gammadidae		
Summit Lake	SL0617	scud	3		Crustacea	Amphipoda	Gammadidae		
Summit Lake	SL0619	scud	1		Crustacea	Amphipoda	Gammadidae		
Summit Lake	SL0620	scud	1		Crustacea	Amphipoda	Gammadidae		
Summit Lake	SL0622	scud	3		Crustacea	Amphipoda	Gammadidae		
Summit Lake	SL0623	scud	12		Crustacea	Amphipoda	Gammadidae		
Summit Lake	SL0628	scud	4		Crustacea	Amphipoda	Gammadidae		
Summit Lake	SL0630	scud	1		Crustacea	Amphipoda	Gammadidae		
Fallin Timber	FT0606	scud	3		Crustacea	Amphipoda	Gammadidae		
Fallin Timber	FT0611	scud	4		Crustacea	Amphipoda	Gammadidae		
Fallin Timber	FT0612	scud	22		Crustacea	Amphipoda	Gammadidae		
Fallin Timber	FT0613	scud	13		Crustacea	Amphipoda	Gammadidae		
Fallin Timber	FT0614	scud	1		Crustacea	Amphipoda	Gammadidae		
Fallin Timber	FT0617	scud	17		Crustacea	Amphipoda	Gammadidae		
Fallin Timber	FT0618	scud	5		Crustacea	Amphipoda	Gammadidae		
Fallin Timber	FT0627	scud	3		Crustacea	Amphipoda	Gammadidae		

Table C-4. Non crayfish burrow co-inhabitants continued.									
Site name	**Burrow name**	**Organism**	**Number**	**Scientific name**	**Class**	**Order**	**Family**	**Comment**	**Group totals**
Fallin Timber	FT0638	scud	18		Crustacea	Amphipoda	Gammadidae		
Fallin Timber	FT0641	scud	1		Crustacea	Amphipoda	Gammadidae		
Fallin Timber	FT0642	scud	5		Crustacea	Amphipoda	Gammadidae		
Fallin Timber	FT0644	scud	2		Crustacea	Amphipoda	Gammadidae		326
Bean Blossum Bottom	BBB0533	Bosmina	2		Crustacea	Cladocera	Bosminidae		
Bean Blossum Bottom	BBB0535	Bosmina	9		Crustacea	Cladocera	Bosminidae		
Bean Blossum Bottom	BBB0538	Bosmina	31		Crustacea	Cladocera	Bosminidae		
Bean Blossum Bottom	BBB0539	Bosmina	1000		Crustacea	Cladocera	Bosminidae		
Bean Blossum Bottom	BBB0540	Bosmina	2		Crustacea	Cladocera	Bosminidae		
Bean Blossum Bottom	BBB0541	Bosmina	85		Crustacea	Cladocera	Bosminidae		
Bean Blossum Bottom	BBB0542	Bosmina	1		Crustacea	Cladocera	Bosminidae		
Bean Blossum Bottom	BBB0543	Bosmina	48		Crustacea	Cladocera	Bosminidae		
Bean Blossum Bottom	BBB0544	Bosmina	1		Crustacea	Cladocera	Bosminidae		
Bean Blossum Bottom	BBB0545	Bosmina	59		Crustacea	Cladocera	Bosminidae		
Bean Blossum Bottom	BBB0547	Bosmina	56		Crustacea	Cladocera	Bosminidae		
Bean Blossum Bottom	BBB0548	Bosmina	175	Eubosmina coregoni	Crustacea	Cladocera	Bosminidae		
Bean Blossum Bottom	BBB0549	Bosmina	61		Crustacea	Cladocera	Bosminidae		
Bean Blossum Bottom	BBB0550	Bosmina	3		Crustacea	Cladocera	Bosminidae		
Bean Blossum Bottom	BBB0551	Bosmina	55		Crustacea	Cladocera	Bosminidae		
Bean Blossum Bottom	BBB0552	Bosmina	1		Crustacea	Cladocera	Bosminidae		
Bean Blossum Bottom	BBB0553	Bosmina	16		Crustacea	Cladocera	Bosminidae		
Bean Blossum Bottom	BBB0554	Bosmina	147		Crustacea	Cladocera	Bosminidae		
Bean Blossum Bottom	BBB0555	Bosmina	15		Crustacea	Cladocera	Bosminidae		
Bean Blossum Bottom	BBB0557	Bosmina	5		Crustacea	Cladocera	Bosminidae		
Bean Blossum Bottom	BBB0558	Bosmina	75		Crustacea	Cladocera	Bosminidae		
Potowatami Nature Preserve	PNP0603	Bosmina	1		Crustacea	Cladocera	Bosminidae		
Potowatami Nature Preserve	PNP0604	Bosmina	11		Crustacea	Cladocera	Bosminidae		
Potowatami Nature Preserve	PNP0605	Bosmina	3		Crustacea	Cladocera	Bosminidae		
Potowatami Nature Preserve	PNP0607	Bosmina	1		Crustacea	Cladocera	Bosminidae		
Potowatami Nature Preserve	PNP0608	Bosmina	29		Crustacea	Cladocera	Bosminidae		
Potowatami Nature Preserve	PNP0609	Bosmina	7		Crustacea	Cladocera	Bosminidae		

Table C-4. Non crayfish burrow co-inhabitants continued.									
Site name	**Burrow name**	**Organism**	**Number**	**Scientific name**	**Class**	**Order**	**Family**	**Comment**	**Group totals**
Potowatami Nature Preserve	PNP0610	Bosmina	29		Crustacea	Cladocera	Bosminidae		
Potowatami Nature Preserve	PNP0611	Bosmina	1		Crustacea	Cladocera	Bosminidae		
Potowatami Nature Preserve	PNP0620	Bosmina	1		Crustacea	Cladocera	Bosminidae		
Potowatami Nature Preserve	PNP0621	Bosmina	1		Crustacea	Cladocera	Bosminidae		
Potowatami Nature Preserve	PNP0631	Bosmina	1		Crustacea	Cladocera	Bosminidae		
Potowatami Nature Preserve	PNP0632	Bosmina	1		Crustacea	Cladocera	Bosminidae		
Potowatami Nature Preserve	PNP0634	Bosmina	1		Crustacea	Cladocera	Bosminidae		
Potowatami Nature Preserve	PNP0635	Bosmina	1		Crustacea	Cladocera	Bosminidae		
Potowatami Nature Preserve	PNP0638	Bosmina	1		Crustacea	Cladocera	Bosminidae		
Summit Lake	SL0614	Bosmina	1		Crustacea	Cladocera	Bosminidae		
Summit Lake	SL0616	Bosmina	1		Crustacea	Cladocera	Bosminidae		
Summit Lake	SL0617	Bosmina	14		Crustacea	Cladocera	Bosminidae		
Summit Lake	SL0617	Bosmina	1000		Crustacea	Cladocera	Bosminidae		
Summit Lake	SL0618	Bosmina	1000		Crustacea	Cladocera	Bosminidae		
Summit Lake	SL0620	Bosmina	30		Crustacea	Cladocera	Bosminidae		
Summit Lake	SL0621	Bosmina	1		Crustacea	Cladocera	Bosminidae		
Summit Lake	SL0622	Bosmina	10		Crustacea	Cladocera	Bosminidae		
Summit Lake	SL0623	Bosmina	54		Crustacea	Cladocera	Bosminidae		
Summit Lake	SL0625	Bosmina	39		Crustacea	Cladocera	Bosminidae		
Summit Lake	SL0626	Bosmina	74		Crustacea	Cladocera	Bosminidae		
Summit Lake	SL0629	Bosmina	255		Crustacea	Cladocera	Bosminidae		
Summit Lake	SL0630	Bosmina	134		Crustacea	Cladocera	Bosminidae		
Summit Lake	SL0631	Bosmina	1		Crustacea	Cladocera	Bosminidae		
Summit Lake	SL0632	Bosmina	2		Crustacea	Cladocera	Bosminidae		
Summit Lake	SL0635	Bosmina	1000		Crustacea	Cladocera	Bosminidae		
Summit Lake	SL0636	Bosmina	1000		Crustacea	Cladocera	Bosminidae		
Summit Lake	SL0637	Bosmina	99		Crustacea	Cladocera	Bosminidae		
Summit Lake	SL0638	Bosmina	1000		Crustacea	Cladocera	Bosminidae		
Summit Lake	SL0639	Bosmina	1000		Crustacea	Cladocera	Bosminidae		
Fallin Timber	FT0611	Bosmina	15		Crustacea	Cladocera	Bosminidae		
Fallin Timber	FT0616	Bosmina	1		Crustacea	Cladocera	Bosminidae		

Table C-4. Non crayfish burrow co-inhabitants continued.									
Site name	**Burrow name**	**Organism**	**Number**	**Scientific name**	**Class**	**Order**	**Family**	**Comment**	**Group totals**
Fallin Timber	FT0627	Bosmina	1		Crustacea	Cladocera	Bosminidae		
Fallin Timber	FT0632	Bosmina	1		Crustacea	Cladocera	Bosminidae		
Fallin Timber	FT0633	Bosmina	10		Crustacea	Cladocera	Bosminidae		
Fallin Timber	FT0635	Bosmina	3		Crustacea	Cladocera	Bosminidae		
Fallin Timber	FT0644	Bosmina	1		Crustacea	Cladocera	Bosminidae		
Fallin Timber	FT0645	Bosmina	2		Crustacea	Cladocera	Bosminidae		
Fallin Timber	FT0647	Bosmina	5		Crustacea	Cladocera	Bosminidae		
Fallin Timber	FT0648	Bosmina	3		Crustacea	Cladocera	Bosminidae		8,693+
Potowatami Nature Preserve	PNP0608	Chydoridae	1		Crustacea	Cladocera	Chydoridae		1
Bloomfield Barrens	BFB0501	Cladocera	64		Crustacea	Cladocera	Daphnidae		
Bloomfield Barrens	BFB0502	Cladocera	19		Crustacea	Cladocera	Daphnidae		
Bloomfield Barrens	BFB0503	Cladocera	12		Crustacea	Cladocera	Daphnidae		
Bloomfield Barrens	BFB0504	Cladocera	18		Crustacea	Cladocera	Daphnidae		
Bloomfield Barrens	BFB0505	Cladocera	83		Crustacea	Cladocera	Daphnidae		
Bloomfield Barrens	BFB0513	Cladocera	59		Crustacea	Cladocera	Daphnidae		
Bloomfield Barrens	BFB0514	Cladocera	234		Crustacea	Cladocera	Daphnidae		
Bloomfield Barrens	BFB0515	Cladocera	94		Crustacea	Cladocera	Daphnidae		
Bloomfield Barrens	BFB0513b	Cladocera	2		Crustacea	Cladocera	Daphnidae		
Bean Blossum Bottom	BBB0502	Cladocera	52		Crustacea	Cladocera	Daphnidae		
Bean Blossum Bottom	BBB0503	Cladocera	18		Crustacea	Cladocera	Daphnidae		
Bean Blossum Bottom	BBB0504	Cladocera	18		Crustacea	Cladocera	Daphnidae		
Bean Blossum Bottom	BBB0505	Cladocera	50		Crustacea	Cladocera	Daphnidae		
Bean Blossum Bottom	BBB0506	Cladocera	1		Crustacea	Cladocera	Daphnidae		
Bean Blossum Bottom	BBB0510	Cladocera	2		Crustacea	Cladocera	Daphnidae		
Bean Blossum Bottom	BBB0511	Cladocera	3		Crustacea	Cladocera	Daphnidae		
Bean Blossum Bottom	BBB0513	Cladocera	6		Crustacea	Cladocera	Daphnidae		
Bean Blossum Bottom	BBB0516	Cladocera	2		Crustacea	Cladocera	Daphnidae		
Bean Blossum Bottom	BBB0519	Cladocera	10		Crustacea	Cladocera	Daphnidae		
Bean Blossum Bottom	BBB0521	Cladocera	1		Crustacea	Cladocera	Daphnidae		
Bean Blossum Bottom	BBB0526	Cladocera	15		Crustacea	Cladocera	Daphnidae		
Bean Blossum Bottom	BBB0530	Cladocera	2		Crustacea	Cladocera	Daphnidae		

Table C-4. Non crayfish burrow co-inhabitants continued.									
Site name	**Burrow name**	**Organism**	**Number**	**Scientific name**	**Class**	**Order**	**Family**	**Comment**	**Group totals**
Potowatami Nature Preserve	PNP0613	Cladocera	55		Crustacea	Cladocera	Daphnidae		
Potowatami Nature Preserve	PNP0614	Cladocera	2		Crustacea	Cladocera	Daphnidae		
Potowatami Nature Preserve	PNP0615	Cladocera	2		Crustacea	Cladocera	Daphnidae		
Potowatami Nature Preserve	PNP0630	Cladocera	1		Crustacea	Cladocera	Daphnidae		11,736+
Summit Lake	SL0619	daphnia	1000		Crustacea	Cladocera	Daphnidae		
Summit Lake	SL0620	daphnia	1000		Crustacea	Cladocera	Daphnidae		
Summit Lake	SL0621	daphnia	1000		Crustacea	Cladocera	Daphnidae		
Summit Lake	SL0622	daphnia	1000		Crustacea	Cladocera	Daphnidae		
Summit Lake	SL0623	daphnia	1000		Crustacea	Cladocera	Daphnidae		
Summit Lake	SL0625	daphnia	1000		Crustacea	Cladocera	Daphnidae		
Summit Lake	SL0626	daphnia	1000		Crustacea	Cladocera	Daphnidae		
Summit Lake	SL0627	daphnia	1000		Crustacea	Cladocera	Daphnidae		8,000+
Hoosier Prairie	HP200506	Cyclopoida	1000		Crustacea	Copepoda	Cyclopoida		
Hoosier Prairie	HP200507	Cyclopoida	2		Crustacea	Copepoda	Cyclopoida		
Hoosier Prairie	HP200508	Cyclopoida	13		Crustacea	Copepoda	Cyclopoida		
Hoosier Prairie	HP200513	Cyclopoida	68		Crustacea	Copepoda	Cyclopoida		
Hoosier Prairie	HP200514	Cyclopoida	4		Crustacea	Copepoda	Cyclopoida		
Bloomfield Barrens	BFB0501	Cyclopoida	57		Crustacea	Copepoda	Cyclopoida		
Bloomfield Barrens	BFB0502	Cyclopoida	48		Crustacea	Copepoda	Cyclopoida		
Bloomfield Barrens	BFB0503	Cyclopoida	49		Crustacea	Copepoda	Cyclopoida		
Bloomfield Barrens	BFB0504	Cyclopoida	44		Crustacea	Copepoda	Cyclopoida		
Bloomfield Barrens	BFB0505	Cyclopoida	118		Crustacea	Copepoda	Cyclopoida		
Bloomfield Barrens	BFB0507	Cyclopoida	13		Crustacea	Copepoda	Cyclopoida		
Bloomfield Barrens	BFB0508	Cyclopoida	20		Crustacea	Copepoda	Cyclopoida		
Bloomfield Barrens	BFB0510	Cyclopoida	11		Crustacea	Copepoda	Cyclopoida		
Bloomfield Barrens	BFB0511	Cyclopoida	1		Crustacea	Copepoda	Cyclopoida		
Bloomfield Barrens	BFB0512	Cyclopoida	7		Crustacea	Copepoda	Cyclopoida		
Bloomfield Barrens	BFB0513	Cyclopoida	7		Crustacea	Copepoda	Cyclopoida		
Bloomfield Barrens	BFB0514	Cyclopoida	108		Crustacea	Copepoda	Cyclopoida		
Bloomfield Barrens	BFB0515	Cyclopoida	44		Crustacea	Copepoda	Cyclopoida		
Bloomfield Barrens	BFB0513b	Cyclopoida	38		Crustacea	Copepoda	Cyclopoida		

Table C-4. Non crayfish burrow co-inhabitants continued.									
Site name	**Burrow name**	**Organism**	**Number**	**Scientific name**	**Class**	**Order**	**Family**	**Comment**	**Group totals**
Bloomfield Barrens	BFB0515b	Cyclopoida	1		Crustacea	Copepoda	Cyclopoida		
Bloomfield Barrens	BFB0516	Cyclopoida	2		Crustacea	Copepoda	Cyclopoida		
Bloomfield Barrens	BFB0517	Cyclopoida	1		Crustacea	Copepoda	Cyclopoida		
Bloomfield Barrens	BFB0519b	Cyclopoida	1		Crustacea	Copepoda	Cyclopoida		
Bloomfield Barrens	BFB0520b	Cyclopoida	2		Crustacea	Copepoda	Cyclopoida		
Bloomfield Barrens	BFB0526	Cyclopoida	2		Crustacea	Copepoda	Cyclopoida		
Bloomfield Barrens	BFB0531	Cyclopoida	8		Crustacea	Copepoda	Cyclopoida		
Bean Blossum Bottom	BBB0501	Cyclopoida	77		Crustacea	Copepoda	Cyclopoida		
Bean Blossum Bottom	BBB0502	Cyclopoida	71		Crustacea	Copepoda	Cyclopoida		
Bean Blossum Bottom	BBB0503	Cyclopoida	57		Crustacea	Copepoda	Cyclopoida		
Bean Blossum Bottom	BBB0504	Cyclopoida	88		Crustacea	Copepoda	Cyclopoida		
Bean Blossum Bottom	BBB0505	Cyclopoida	56		Crustacea	Copepoda	Cyclopoida		
Bean Blossum Bottom	BBB0506	Cyclopoida	213		Crustacea	Copepoda	Cyclopoida		
Bean Blossum Bottom	BBB0507	Cyclopoida	8		Crustacea	Copepoda	Cyclopoida		
Bean Blossum Bottom	BBB0509	Cyclopoida	22		Crustacea	Copepoda	Cyclopoida		
Bean Blossum Bottom	BBB0510	Cyclopoida	25		Crustacea	Copepoda	Cyclopoida		
Bean Blossum Bottom	BBB0511	Cyclopoida	24		Crustacea	Copepoda	Cyclopoida		
Bean Blossum Bottom	BBB0512	Cyclopoida	1		Crustacea	Copepoda	Cyclopoida		
Bean Blossum Bottom	BBB0513	Cyclopoida	57		Crustacea	Copepoda	Cyclopoida		
Bean Blossum Bottom	BBB0514	Cyclopoida	4		Crustacea	Copepoda	Cyclopoida		
Bean Blossum Bottom	BBB0515	Cyclopoida	4		Crustacea	Copepoda	Cyclopoida		
Bean Blossum Bottom	BBB0516	Cyclopoida	19		Crustacea	Copepoda	Cyclopoida		
Bean Blossum Bottom	BBB0518	Cyclopoida	112		Crustacea	Copepoda	Cyclopoida		
Bean Blossum Bottom	BBB0519	Cyclopoida	8		Crustacea	Copepoda	Cyclopoida		
Bean Blossum Bottom	BBB0521	Cyclopoida	34		Crustacea	Copepoda	Cyclopoida		
Bean Blossum Bottom	BBB0522	Cyclopoida	3		Crustacea	Copepoda	Cyclopoida		
Bean Blossum Bottom	BBB0523	Cyclopoida	1		Crustacea	Copepoda	Cyclopoida		
Bean Blossum Bottom	BBB0524	Cyclopoida	6		Crustacea	Copepoda	Cyclopoida		
Bean Blossum Bottom	BBB0525	Cyclopoida	18		Crustacea	Copepoda	Cyclopoida		
Bean Blossum Bottom	BBB0526	Cyclopoida	94		Crustacea	Copepoda	Cyclopoida		
Bean Blossum Bottom	BBB0528	Cyclopoida	178		Crustacea	Copepoda	Cyclopoida		

Table C-4. Non crayfish burrow co-inhabitants continued.									
Site name	**Burrow name**	**Organism**	**Number**	**Scientific name**	**Class**	**Order**	**Family**	**Comment**	**Group totals**
Bean Blossum Bottom	BBB0528	Cyclopoida	1		Crustacea	Copepoda	Cyclopoida		
Bean Blossum Bottom	BBB0529	Cyclopoida	20		Crustacea	Copepoda	Cyclopoida		
Bean Blossum Bottom	BBB0530	Cyclopoida	33		Crustacea	Copepoda	Cyclopoida		
Bean Blossum Bottom	BBB0531	Cyclopoida	1		Crustacea	Copepoda	Cyclopoida		
Bean Blossum Bottom	BBB0533	Cyclopoida	22		Crustacea	Copepoda	Cyclopoida		
Bean Blossum Bottom	BBB0534	Cyclopoida	99		Crustacea	Copepoda	Cyclopoida		
Bean Blossum Bottom	BBB0535	Cyclopoida	90		Crustacea	Copepoda	Cyclopoida		
Bean Blossum Bottom	BBB0536	Cyclopoida	5		Crustacea	Copepoda	Cyclopoida		
Bean Blossum Bottom	BBB0537	Cyclopoida	20		Crustacea	Copepoda	Cyclopoida		
Bean Blossum Bottom	BBB0538	Cyclopoida	21		Crustacea	Copepoda	Cyclopoida		
Bean Blossum Bottom	BBB0539	Cyclopoida	1000		Crustacea	Copepoda	Cyclopoida		
Bean Blossum Bottom	BBB0540	Cyclopoida	20		Crustacea	Copepoda	Cyclopoida		
Bean Blossum Bottom	BBB0541	Cyclopoida	104		Crustacea	Copepoda	Cyclopoida		
Bean Blossum Bottom	BBB0542	Cyclopoida	65		Crustacea	Copepoda	Cyclopoida		
Bean Blossum Bottom	BBB0543	Cyclopoida	76		Crustacea	Copepoda	Cyclopoida		
Bean Blossum Bottom	BBB0544	Cyclopoida	40		Crustacea	Copepoda	Cyclopoida		
Bean Blossum Bottom	BBB0545	Cyclopoida	97		Crustacea	Copepoda	Cyclopoida		
Bean Blossum Bottom	BBB0547	Cyclopoida	26		Crustacea	Copepoda	Cyclopoida		
Bean Blossum Bottom	BBB0548	Cyclopoida	38		Crustacea	Copepoda	Cyclopoida		
Bean Blossum Bottom	BBB0549	Cyclopoida	34		Crustacea	Copepoda	Cyclopoida		
Bean Blossum Bottom	BBB0550	Cyclopoida	55		Crustacea	Copepoda	Cyclopoida		
Bean Blossum Bottom	BBB0551	Cyclopoida	104		Crustacea	Copepoda	Cyclopoida		
Bean Blossum Bottom	BBB0552	Cyclopoida	7		Crustacea	Copepoda	Cyclopoida		
Bean Blossum Bottom	BBB0553	Cyclopoida	11		Crustacea	Copepoda	Cyclopoida		
Bean Blossum Bottom	BBB0554	Cyclopoida	46		Crustacea	Copepoda	Cyclopoida		
Bean Blossum Bottom	BBB0555	Cyclopoida	234		Crustacea	Copepoda	Cyclopoida		
Bean Blossum Bottom	BBB0556	Cyclopoida	29		Crustacea	Copepoda	Cyclopoida		
Bean Blossum Bottom	BBB0557	Cyclopoida	284		Crustacea	Copepoda	Cyclopoida		
Bean Blossum Bottom	BBB0558	Cyclopoida	87		Crustacea	Copepoda	Cyclopoida		
Potowatami Nature Preserve	PNP0601	Cyclopoida	1		Crustacea	Copepoda	Cyclopoida		
Potowatami Nature Preserve	PNP0602	Cyclopoida	2		Crustacea	Copepoda	Cyclopoida		

Table C-4. Non crayfish burrow co-inhabitants continued.									
Site name	**Burrow name**	**Organism**	**Number**	**Scientific name**	**Class**	**Order**	**Family**	**Comment**	**Group totals**
Potowatami Nature Preserve	PNP0603	Cyclopoida	5		Crustacea	Copepoda	Cyclopoida		
Potowatami Nature Preserve	PNP0604	Cyclopoida	10		Crustacea	Copepoda	Cyclopoida		
Potowatami Nature Preserve	PNP0605	Cyclopoida	18		Crustacea	Copepoda	Cyclopoida		
Potowatami Nature Preserve	PNP0606	Cyclopoida	11		Crustacea	Copepoda	Cyclopoida		
Potowatami Nature Preserve	PNP0607	Cyclopoida	24		Crustacea	Copepoda	Cyclopoida		
Potowatami Nature Preserve	PNP0608	Cyclopoida	22		Crustacea	Copepoda	Cyclopoida		
Potowatami Nature Preserve	PNP0609	Cyclopoida	22		Crustacea	Copepoda	Cyclopoida		
Potowatami Nature Preserve	PNP0610	Cyclopoida	56		Crustacea	Copepoda	Cyclopoida		
Potowatami Nature Preserve	PNP0611	Cyclopoida	172		Crustacea	Copepoda	Cyclopoida		
Potowatami Nature Preserve	PNP0612	Cyclopoida	8		Crustacea	Copepoda	Cyclopoida		
Potowatami Nature Preserve	PNP0613	Cyclopoida	18		Crustacea	Copepoda	Cyclopoida		
Potowatami Nature Preserve	PNP0615	Cyclopoida	12		Crustacea	Copepoda	Cyclopoida		
Potowatami Nature Preserve	PNP0616	Cyclopoida	34		Crustacea	Copepoda	Cyclopoida		
Potowatami Nature Preserve	PNP0619	Cyclopoida	9		Crustacea	Copepoda	Cyclopoida		
Potowatami Nature Preserve	PNP0620	Cyclopoida	3		Crustacea	Copepoda	Cyclopoida		
Potowatami Nature Preserve	PNP0621	Cyclopoida	2		Crustacea	Copepoda	Cyclopoida		
Potowatami Nature Preserve	PNP0622	Cyclopoida	18		Crustacea	Copepoda	Cyclopoida		
Potowatami Nature Preserve	PNP0623	Cyclopoida	2		Crustacea	Copepoda	Cyclopoida		
Potowatami Nature Preserve	PNP0624	Cyclopoida	2		Crustacea	Copepoda	Cyclopoida		
Potowatami Nature Preserve	PNP0625	Cyclopoida	3		Crustacea	Copepoda	Cyclopoida		
Potowatami Nature Preserve	PNP0626	Cyclopoida	4		Crustacea	Copepoda	Cyclopoida		
Potowatami Nature Preserve	PNP0629	Cyclopoida	20		Crustacea	Copepoda	Cyclopoida		
Potowatami Nature Preserve	PNP0629	Cyclopoida	7		Crustacea	Copepoda	Cyclopoida		
Potowatami Nature Preserve	PNP0630	Cyclopoida	5		Crustacea	Copepoda	Cyclopoida		
Potowatami Nature Preserve	PNP0631	Cyclopoida	4		Crustacea	Copepoda	Cyclopoida		
Potowatami Nature Preserve	PNP0632	Cyclopoida	4		Crustacea	Copepoda	Cyclopoida		
Potowatami Nature Preserve	PNP0633	Cyclopoida	5		Crustacea	Copepoda	Cyclopoida		
Potowatami Nature Preserve	PNP0634	Cyclopoida	10		Crustacea	Copepoda	Cyclopoida		
Potowatami Nature Preserve	PNP0635	Cyclopoida	19		Crustacea	Copepoda	Cyclopoida		
Potowatami Nature Preserve	PNP0637	Cyclopoida	2		Crustacea	Copepoda	Cyclopoida		
Potowatami Nature Preserve	PNP0638	Cyclopoida	19		Crustacea	Copepoda	Cyclopoida		

Table C-4. Non crayfish burrow co-inhabitants continued.									
Site name	**Burrow name**	**Organism**	**Number**	**Scientific name**	**Class**	**Order**	**Family**	**Comment**	**Group totals**
Potowatami Nature Preserve	PNP0639	Cyclopoida	17		Crustacea	Copepoda	Cyclopoida		
Summit Lake	SL0606	Cyclopoida	4		Crustacea	Copepoda	Cyclopoida		
Summit Lake	SL0611	Cyclopoida	16		Crustacea	Copepoda	Cyclopoida		
Summit Lake	SL0612	Cyclopoida	8		Crustacea	Copepoda	Cyclopoida		
Summit Lake	SL0613	Cyclopoida	2		Crustacea	Copepoda	Cyclopoida		
Summit Lake	SL0614	Cyclopoida	3		Crustacea	Copepoda	Cyclopoida		
Summit Lake	SL0615	Cyclopoida	2		Crustacea	Copepoda	Cyclopoida		
Summit Lake	SL0616	Cyclopoida	2		Crustacea	Copepoda	Cyclopoida		
Summit Lake	SL0617	Cyclopoida	84		Crustacea	Copepoda	Cyclopoida		
Summit Lake	SL0619	Cyclopoida	106		Crustacea	Copepoda	Cyclopoida		
Summit Lake	SL0620	Cyclopoida	37		Crustacea	Copepoda	Cyclopoida		
Summit Lake	SL0621	Cyclopoida	50		Crustacea	Copepoda	Cyclopoida		
Summit Lake	SL0622	Cyclopoida	5		Crustacea	Copepoda	Cyclopoida		
Fallin Timber	FT0611	Cyclopoida	102		Crustacea	Copepoda	Cyclopoida		
Fallin Timber	FT0612	Cyclopoida	4		Crustacea	Copepoda	Cyclopoida		
Fallin Timber	FT0613	Cyclopoida	1		Crustacea	Copepoda	Cyclopoida		
Fallin Timber	FT0614	Cyclopoida	6		Crustacea	Copepoda	Cyclopoida		
Fallin Timber	FT0615	Cyclopoida	2		Crustacea	Copepoda	Cyclopoida		
Fallin Timber	FT0616	Cyclopoida	3		Crustacea	Copepoda	Cyclopoida		
Fallin Timber	FT0617	Cyclopoida	16		Crustacea	Copepoda	Cyclopoida		
Fallin Timber	FT0618	Cyclopoida	2		Crustacea	Copepoda	Cyclopoida		
Fallin Timber	FT0621	Cyclopoida	12		Crustacea	Copepoda	Cyclopoida		
Fallin Timber	FT0623	Cyclopoida	2		Crustacea	Copepoda	Cyclopoida		
Fallin Timber	FT0627	Cyclopoida	6		Crustacea	Copepoda	Cyclopoida		
Fallin Timber	FT0631	Cyclopoida	2		Crustacea	Copepoda	Cyclopoida		
Fallin Timber	FT0632	Cyclopoida	19		Crustacea	Copepoda	Cyclopoida		
Fallin Timber	FT0633	Cyclopoida	1		Crustacea	Copepoda	Cyclopoida		
Fallin Timber	FT0634	Cyclopoida	2		Crustacea	Copepoda	Cyclopoida		
Fallin Timber	FT0636	Cyclopoida	2		Crustacea	Copepoda	Cyclopoida		
Fallin Timber	FT0635	Cyclopoida	8		Crustacea	Copepoda	Cyclopoida		
Fallin Timber	FT0637	Cyclopoida	2		Crustacea	Copepoda	Cyclopoida		

Table C-4. Non crayfish burrow co-inhabitants continued.									
Site name	**Burrow name**	**Organism**	**Number**	**Scientific name**	**Class**	**Order**	**Family**	**Comment**	**Group totals**
Fallin Timber	FT0638	Cyclopoida	3		Crustacea	Copepoda	Cyclopoida		
Fallin Timber	FT0641	Cyclopoida	7		Crustacea	Copepoda	Cyclopoida		
Fallin Timber	FT0643	Cyclopoida	5		Crustacea	Copepoda	Cyclopoida		
Fallin Timber	FT0644	Cyclopoida	6		Crustacea	Copepoda	Cyclopoida		
Fallin Timber	FT0645	Cyclopoida	18		Crustacea	Copepoda	Cyclopoida		
Fallin Timber	FT0646	Cyclopoida	32		Crustacea	Copepoda	Cyclopoida		
Fallin Timber	FT0647	Cyclopoida	4		Crustacea	Copepoda	Cyclopoida		
Fallin Timber	FT0648	Cyclopoida	2		Crustacea	Copepoda	Cyclopoida		7,180+
Turkey Run	RFT-04-88-20	Harpacticoida	47		Crustacea	Copepoda	Harpacticidae		
Hoosier Prairie	RFT-04-45-10	Harpacticoida	7		Crustacea	Copepoda	Harpacticidae		
Hoosier Prairie	RFT-04-45-11	Harpacticoida	214		Crustacea	Copepoda	Harpacticidae		
Hoosier Prairie	RFT-04-45-14	Harpacticoida	26		Crustacea	Copepoda	Harpacticidae		
Hoosier Prairie	RFT-04-45-16	Harpacticoida	80		Crustacea	Copepoda	Harpacticidae		
Hoosier Prairie	RFT-04-45-18	Harpacticoida	26		Crustacea	Copepoda	Harpacticidae		
Hoosier Prairie	RFT-04-45-2	Harpacticoida	24		Crustacea	Copepoda	Harpacticidae		
Hoosier Prairie	RFT-04-45-20	Harpacticoida	17		Crustacea	Copepoda	Harpacticidae		
Hoosier Prairie	RFT-04-45-3	Harpacticoida	12		Crustacea	Copepoda	Harpacticidae		
Hoosier Prairie	RFT-04-45-4	Harpacticoida	52		Crustacea	Copepoda	Harpacticidae		
Hoosier Prairie	RFT-04-45-5	Harpacticoida	12		Crustacea	Copepoda	Harpacticidae		
Hoosier Prairie	RFT-04-45-8	Harpacticoida	2583		Crustacea	Copepoda	Harpacticidae		
Hoosier Prairie	RFT-04-45-9	Harpacticoida	54		Crustacea	Copepoda	Harpacticidae		
Hoosier Prairie	RFT-04-89-10	Harpacticoida	2		Crustacea	Copepoda	Harpacticidae		
Hoosier Prairie	RFT-04-89-15	Harpacticoida	1		Crustacea	Copepoda	Harpacticidae		
Twin Swamps	RFT-04-44-13	Harpacticoida	1		Crustacea	Copepoda	Harpacticidae		
Twin Swamps	RFT-04-44-4	Harpacticoida	6		Crustacea	Copepoda	Harpacticidae		
Twin Swamps	RFT-04-87-12	Harpacticoida	1		Crustacea	Copepoda	Harpacticidae		
Turkey Run	RFT-04-46-11	Harpacticoida	1		Crustacea	Copepoda	Harpacticidae		
Hoosier Prairie	RFT-04-89-21	Harpacticoida	1		Crustacea	Copepoda	Harpacticidae		
Hoosier Prairie	RFT-04-89-24	Harpacticoida	3		Crustacea	Copepoda	Harpacticidae		
Hoosier Prairie	RFT-04-89-6	Harpacticoida	5		Crustacea	Copepoda	Harpacticidae		
Hoosier Prairie	RFT-04-89-9	Harpacticoida	1		Crustacea	Copepoda	Harpacticidae		

Table C-4. Non crayfish burrow co-inhabitants continued.									
Site name	**Burrow name**	**Organism**	**Number**	**Scientific name**	**Class**	**Order**	**Family**	**Comment**	**Group totals**
Hoosier Prairie	HP200505	Harpacticoida	4		Crustacea	Copepoda	Harpacticidae		
Hoosier Prairie	HP200514	Copopoda	43		Crustacea	Copepoda	Harpacticidae		
Turkey Run	TR0510	Harpacticoida	1		Crustacea	Copepoda	Harpacticidae		
Bloomfield Barrens	BFB0507	Harpacticoida	3		Crustacea	Copepoda	Harpacticidae		
Bloomfield Barrens	BFB0513	Harpacticoida	1		Crustacea	Copepoda	Harpacticidae		
Bean Blossum Bottom	BBB0516	Harpacticoida	2		Crustacea	Copepoda	Harpacticidae		
Bean Blossum Bottom	BBB0519	Harpacticoida	1		Crustacea	Copepoda	Harpacticidae		
Potowatami Nature Preserve	PNP0601	Harpacticoida	1		Crustacea	Copepoda	Harpacticidae		
Potowatami Nature Preserve	PNP0607	Harpacticoida	2		Crustacea	Copepoda	Harpacticidae		
Potowatami Nature Preserve	PNP0623	Harpacticoida	1		Crustacea	Copepoda	Harpacticidae		
Potowatami Nature Preserve	PNP0626	Harpacticoida	1		Crustacea	Copepoda	Harpacticidae		
Potowatami Nature Preserve	PNP0629	Harpacticoida	3		Crustacea	Copepoda	Harpacticidae		
Potowatami Nature Preserve	PNP0630	Harpacticoida	1		Crustacea	Copepoda	Harpacticidae		
Potowatami Nature Preserve	PNP0631	Harpacticoida	3		Crustacea	Copepoda	Harpacticidae		
Potowatami Nature Preserve	PNP0632	Harpacticoida	2		Crustacea	Copepoda	Harpacticidae		
Potowatami Nature Preserve	PNP0637	Harpacticoida	2		Crustacea	Copepoda	Harpacticidae		
Potowatami Nature Preserve	PNP0638	Harpacticoida	32		Crustacea	Copepoda	Harpacticidae		
Potowatami Nature Preserve	PNP0639	Harpacticoida	15		Crustacea	Copepoda	Harpacticidae		
Summit Lake	SL0623	Harpacticoida	1		Crustacea	Copepoda	Harpacticidae		
Fallin Timber	FT0602	Harpacticoida	3		Crustacea	Copepoda	Harpacticidae		
Fallin Timber	FT0606	Harpacticoida	1		Crustacea	Copepoda	Harpacticidae		
Fallin Timber	FT0607	Harpacticoida	1		Crustacea	Copepoda	Harpacticidae		3,083
Twin Swamps	RFT-04-44-13	crayfish body part	1		Crustacea	Decapoda	Cambaridae		
Twin Swamps	RFT-04-44-7	crayfish body part	1		Crustacea	Decapoda	Cambaridae		
Bloomfield Barrens	BFB0507	crayfish leg	1		Crustacea	Decapoda	Cambaridae		
Bean Blossum Bottom	BBB0503	crayfish egg	7		Crustacea	Decapoda	Cambaridae		
Bean Blossum Bottom	BBB0507	crayfish juveline	1		Crustacea	Decapoda	Cambaridae		
Bean Blossum Bottom	BBB0507	crayfish leg	5		Crustacea	Decapoda	Cambaridae		
Bean Blossum Bottom	BBB0509	crayfish juveline	6		Crustacea	Decapoda	Cambaridae		
Bean Blossum Bottom	BBB0510	crayfish juveline	2		Crustacea	Decapoda	Cambaridae		
Bean Blossum Bottom	BBB0511	crayfish juveline	1		Crustacea	Decapoda	Cambaridae		

Table C-4. Non crayfish burrow co-inhabitants continued.									
Site name	**Burrow name**	**Organism**	**Number**	**Scientific name**	**Class**	**Order**	**Family**	**Comment**	**Group totals**
Bean Blossum Bottom	BBB0529	crayfish body parts	1	Fallicambarus fodiens	Crustacea	Decapoda	Cambaridae		
Summit Lake	SL0618	crayfish body part	1		Crustacea	Decapoda	Cambaridae		27
Hoosier Prairie	HP200502	Calanoida	1		Crustacea	Eucopepoda	Calanoida		
Hoosier Prairie	HP200504	Calanoida	4		Crustacea	Eucopepoda	Calanoida		
Twin Swamps	TS0506	Calanoida	1		Crustacea	Eucopepoda	Calanoida		
Twin Swamps	TS0508	Calanoida	3		Crustacea	Eucopepoda	Calanoida		
Twin Swamps	TS0509	Calanoida	2		Crustacea	Eucopepoda	Calanoida		
Twin Swamps	TS0510	Calanoida	1		Crustacea	Eucopepoda	Calanoida		
Twin Swamps	TS0511	Calanoida	17		Crustacea	Eucopepoda	Calanoida		
Twin Swamps	TS0513	Calanoida	1		Crustacea	Eucopepoda	Calanoida		
Turkey Run	TR0506	Calanoida	9		Crustacea	Eucopepoda	Calanoida		
Turkey Run	TR0510	Calanoida	9		Crustacea	Eucopepoda	Calanoida		
Bean Blossum Bottom	BBB0506	Calanoida	2		Crustacea	Eucopepoda	Calanoida		
Bean Blossum Bottom	BBB0519	Calanoida	2		Crustacea	Eucopepoda	Calanoida		
Summit Lake	SL0623	Calanoida	112		Crustacea	Eucopepoda	Calanoida		
Summit Lake	SL0625	Calanoida	22		Crustacea	Eucopepoda	Calanoida		
Summit Lake	SL0626	Calanoida	72		Crustacea	Eucopepoda	Calanoida		
Summit Lake	SL0627	Calanoida	10		Crustacea	Eucopepoda	Calanoida		
Summit Lake	SL0628	Calanoida	52		Crustacea	Eucopepoda	Calanoida		
Summit Lake	SL0629	Calanoida	102		Crustacea	Eucopepoda	Calanoida		
Summit Lake	SL0630	Calanoida	51		Crustacea	Eucopepoda	Calanoida		
Summit Lake	SL0631	Calanoida	74		Crustacea	Eucopepoda	Calanoida		
Summit Lake	SL0632	Calanoida	178		Crustacea	Eucopepoda	Calanoida		
Summit Lake	SL0633	Calanoida	99		Crustacea	Eucopepoda	Calanoida		
Summit Lake	SL0634	Calanoida	1000		Crustacea	Eucopepoda	Calanoida		
Summit Lake	SL0635	Calanoida	1000		Crustacea	Eucopepoda	Calanoida		
Summit Lake	SL0636	Calanoida	1000		Crustacea	Eucopepoda	Calanoida		
Summit Lake	SL0637	Calanoida	29		Crustacea	Eucopepoda	Calanoida		
Summit Lake	SL0638	Calanoida	1000		Crustacea	Eucopepoda	Calanoida		
Summit Lake	SL0639	Calanoida	1000		Crustacea	Eucopepoda	Calanoida		
Fallin Timber	FT0601	Calanoida	3		Crustacea	Eucopepoda	Calanoida		

Table C-4. Non crayfish burrow co-inhabitants continued.									
Site name	**Burrow name**	**Organism**	**Number**	**Scientific name**	**Class**	**Order**	**Family**	**Comment**	**Group totals**
Fallin Timber	FT0602	Calanoida	1		Crustacea	Eucopepoda	Calanoida		
Fallin Timber	FT0603	Calanoida	6		Crustacea	Eucopepoda	Calanoida		
Fallin Timber	FT0607	Calanoida	13		Crustacea	Eucopepoda	Calanoida		
Fallin Timber	FT0608	Calanoida	2		Crustacea	Eucopepoda	Calanoida		5,878+
Hoosier Prairie	RFT-04-45-14	Asellus sp.	4		Crustacea	Isopoda	Asellidae		
Hoosier Prairie	RFT-04-45-16	Asellus sp.	15		Crustacea	Isopoda	Asellidae		
Hoosier Prairie	RFT-04-45-20	Asellus sp.	2		Crustacea	Isopoda	Asellidae		
Hoosier Prairie	RFT-04-45-3	Asellus sp.	117		Crustacea	Isopoda	Asellidae		
Hoosier Prairie	RFT-04-45-4	Asellus sp.	6		Crustacea	Isopoda	Asellidae		
Hoosier Prairie	RFT-04-45-5	Asellus sp.	1		Crustacea	Isopoda	Asellidae		
Hoosier Prairie	RFT-04-45-8	Asellus sp.	6		Crustacea	Isopoda	Asellidae		
Hoosier Prairie	RFT-04-45-9	Asellus sp.	3		Crustacea	Isopoda	Asellidae		
Hoosier Prairie	RFT-04-89-10	Asellus sp.	3		Crustacea	Isopoda	Asellidae		
Hoosier Prairie	RFT-04-89-16	Asellus sp.	1		Crustacea	Isopoda	Asellidae		
Twin Swamps	RFT-04-44-10	Asellus sp.	1		Crustacea	Isopoda	Asellidae		
Twin Swamps	RFT-04-44-11	Asellus sp.	5		Crustacea	Isopoda	Asellidae		
Twin Swamps	RFT-04-44-4	Asellus sp.	10		Crustacea	Isopoda	Asellidae		
Twin Swamps	RFT-04-44-7	Asellus sp.	5		Crustacea	Isopoda	Asellidae		
Twin Swamps	RFT-04-44-9	Asellus sp.	1		Crustacea	Isopoda	Asellidae		
Twin Swamps	RFT-04-87-10	Asellus sp.	4		Crustacea	Isopoda	Asellidae		
Twin Swamps	RFT-04-87-3	Asellus sp.	2		Crustacea	Isopoda	Asellidae		
Twin Swamps	RFT-04-87-8	Asellus sp.	4		Crustacea	Isopoda	Asellidae		
Hoosier Prairie	RFT-04-89-24	Asellus sp.	1		Crustacea	Isopoda	Asellidae		
Hoosier Prairie	RFT-04-89-9	Asellus sp.	1		Crustacea	Isopoda	Asellidae		
Hoosier Prairie	HP200501	Asellus	1		Crustacea	Isopoda	Asellidae		
Hoosier Prairie	HP200502	Asellus	3		Crustacea	Isopoda	Asellidae		
Hoosier Prairie	HP200503	Asellus	72		Crustacea	Isopoda	Asellidae		
Hoosier Prairie	HP200506	Asellus	38		Crustacea	Isopoda	Asellidae		
Hoosier Prairie	HP200507	Asellus	14		Crustacea	Isopoda	Asellidae		
Hoosier Prairie	HP200508	Asellus	14		Crustacea	Isopoda	Asellidae		
Hoosier Prairie	HP200509	Asellus	2		Crustacea	Isopoda	Asellidae		

Table C-4. Non crayfish burrow co-inhabitants continued.									
Site name	**Burrow name**	**Organism**	**Number**	**Scientific name**	**Class**	**Order**	**Family**	**Comment**	**Group totals**
Hoosier Prairie	HP200513	Asellus	63		Crustacea	Isopoda	Asellidae		
Hoosier Prairie	HP200514	Asellus	42		Crustacea	Isopoda	Asellidae		
Twin Swamps	TS0502	Asellus	7		Crustacea	Isopoda	Asellidae		
Twin Swamps	TS0503	Asellus	1		Crustacea	Isopoda	Asellidae		
Twin Swamps	TS0504	Asellus	4		Crustacea	Isopoda	Asellidae		
Twin Swamps	TS0505	Asellus	1		Crustacea	Isopoda	Asellidae		
Twin Swamps	TS0506	Asellus	24		Crustacea	Isopoda	Asellidae		
Twin Swamps	TS0507	Asellus	1		Crustacea	Isopoda	Asellidae		
Twin Swamps	TS0508	Asellus	18		Crustacea	Isopoda	Asellidae		
Twin Swamps	TS0509	Asellus	17		Crustacea	Isopoda	Asellidae		
Twin Swamps	TS0510	Asellus	42		Crustacea	Isopoda	Asellidae		
Twin Swamps	TS0513	Asellus	22		Crustacea	Isopoda	Asellidae		
Turkey Run	TR0502	Asellus	3		Crustacea	Isopoda	Asellidae		
Turkey Run	TR0506	Asellus	3		Crustacea	Isopoda	Asellidae		
Turkey Run	TR0507	Asellus	1		Crustacea	Isopoda	Asellidae		
Turkey Run	TR0507	Asellus	3		Crustacea	Isopoda	Asellidae		
Turkey Run	TR0509	Asellus	2		Crustacea	Isopoda	Asellidae		
Bloomfield Barrens	BFB0502	Asellus	1		Crustacea	Isopoda	Asellidae		
Bloomfield Barrens	BFB0508	Asellus	3		Crustacea	Isopoda	Asellidae		
Bloomfield Barrens	BFB0513	Asellus	1		Crustacea	Isopoda	Asellidae		
Summit Lake	SL0617	Asellus	1		Crustacea	Isopoda	Asellidae		
Summit Lake	SL0620	Asellus	8		Crustacea	Isopoda	Asellidae		
Summit Lake	SL0620	asellus body part	1		Crustacea	Isopoda	Asellidae		
Summit Lake	SL0622	asellus	2		Crustacea	Isopoda	Asellidae		
Summit Lake	SL0623	asellus	3	Caecidotea sp.	Crustacea	Isopoda	Asellidae		610
Summit Lake	SL0635	isopod terrestrial	2		Crustacea	Isopoda	Asellidae		
Fallin Timber	FT0642	isopod aquatic	1		Crustacea	Isopoda	Asellidae		
Fallin Timber	FT0643	isopod aquatic	1		Crustacea	Isopoda	Asellidae		4
Bloomfield Barrens	BFB0508	Ostracoda	9	Enterocytherid	Crustacea	Ostracodaa	Enterocytherid		
Bloomfield Barrens	BFB0510	Ostracoda	5	Enterocytherid	Crustacea	Ostracodaa	Enterocytherid		
Bloomfield Barrens	BFB0515	Ostracoda	21	Enterocytherid	Crustacea	Ostracodaa	Enterocytherid		

Table C-4. Non crayfish burrow co-inhabitants continued.									
Site name	**Burrow name**	**Organism**	**Number**	**Scientific name**	**Class**	**Order**	**Family**	**Comment**	**Group totals**
Bloomfield Barrens	BFB0511b	Ostracoda	1	Enterocytherid	Crustacea	Ostracodaa	Enterocytherid		
Bloomfield Barrens	BFB0521	Ostracoda	15	Enterocytherid	Crustacea	Ostracodaa	Enterocytherid		
Bloomfield Barrens	BFB0525	Ostracoda	27	Enterocytherid	Crustacea	Ostracodaa	Enterocytherid		
Bloomfield Barrens	BFB0528	Ostracoda	39	Enterocytherid	Crustacea	Ostracodaa	Enterocytherid		
Bloomfield Barrens	BFB0530	Ostracoda	9	Enterocytherid	Crustacea	Ostracodaa	Enterocytherid		
Bloomfield Barrens	BFB0531	Ostracoda	13	Enterocytherid	Crustacea	Ostracodaa	Enterocytherid		
Bean Blossum Bottom	BBB0501	Ostracoda	3	Enterocytherid	Crustacea	Ostracodaa	Enterocytherid		
Bean Blossum Bottom	BBB0530	Ostracoda	3	Entocytherid	Crustacea	Ostracodaa	Enterocytherid		
Bean Blossum Bottom	BBB0539	Ostracoda	30	Entocytherid	Crustacea	Ostracodaa	Enterocytherid		
Bean Blossum Bottom	BBB0541	Ostracoda	6	Entocytherid	Crustacea	Ostracodaa	Enterocytherid		
Bean Blossum Bottom	BBB0547	Ostracoda	2	Entocytherid	Crustacea	Ostracodaa	Enterocytherid		
Bean Blossum Bottom	BBB0552	Ostracoda	1	Entocytherid	Crustacea	Ostracodaa	Enterocytherid		
Potowatami Nature Preserve	PNP0602	Ostracoda	2	Entocytherid	Crustacea	Ostracodaa	Enterocytherid		
Potowatami Nature Preserve	PNP0609	Ostracoda	1	Entocytherid	Crustacea	Ostracodaa	Enterocytherid		
Potowatami Nature Preserve	PNP0613	Ostracoda	1	Entocytherid	Crustacea	Ostracodaa	Enterocytherid		
Potowatami Nature Preserve	PNP0637	Ostracoda	1	Entorocytherid	Crustacea	Ostracodaa	Enterocytherid		
Summit Lake	SL0612	Ostracoda	1	Enterocytherid	Crustacea	Ostracodaa	Enterocytherid		
Summit Lake	SL0619	Ostracoda	1	Enterocytherid	Crustacea	Ostracodaa	Enterocytherid		191
Turkey Run	RFT-04-88-20	Ostracoda	1		Crustacea	Ostracodaa			
Hoosier Prairie	RFT-04-45-8	ostacod	1		Crustacea	Ostracodaa			
Hoosier Prairie	RFT-04-45-9	Ostracoda	1		Crustacea	Ostracodaa			
Twin Swamps	RFT-04-87-13	ostrocod	16		Crustacea	Ostracodaa			
Hoosier Prairie	HP200505	Ostracoda	1		Crustacea	Ostracodaa			
Hoosier Prairie	HP200506	Ostracoda	8		Crustacea	Ostracodaa			
Hoosier Prairie	HP200508	Ostracoda	1		Crustacea	Ostracodaa			
Hoosier Prairie	HP200512	Ostracoda	19		Crustacea	Ostracodaa			
Hoosier Prairie	HP200513	Ostracoda	29		Crustacea	Ostracodaa			
Twin Swamps	TS0511	Ostracoda	4		Crustacea	Ostracodaa			
Turkey Run	TR0510	Ostracoda	1		Crustacea	Ostracodaa			
Bloomfield Barrens	BFB0501	Ostracoda	6		Crustacea	Ostracodaa			
Bloomfield Barrens	BFB0502	Ostracoda	2		Crustacea	Ostracodaa			

Table C-4. Non crayfish burrow co-inhabitants continued.									
Site name	**Burrow name**	**Organism**	**Number**	**Scientific name**	**Class**	**Order**	**Family**	**Comment**	**Group totals**
Bloomfield Barrens	BFB0503	Ostracoda	2		Crustacea	Ostracodaa			
Bloomfield Barrens	BFB0505	Ostracoda	1		Crustacea	Ostracodaa			
Bloomfield Barrens	BFB0510	Ostracoda	10		Crustacea	Ostracodaa			
Bloomfield Barrens	BFB0511	Ostracoda	1		Crustacea	Ostracodaa			
Bloomfield Barrens	BFB0512	Ostracoda	10		Crustacea	Ostracodaa			
Bloomfield Barrens	BFB0513	Ostracoda	1		Crustacea	Ostracodaa			
Bloomfield Barrens	BFB0513b	Ostracoda	1		Crustacea	Ostracodaa			
Bloomfield Barrens	BFB0513b	Ostracoda	35	Enterocytherid	Crustacea	Ostracodaa			
Bean Blossum Bottom	BBB0501	Ostracoda	1		Crustacea	Ostracodaa			
Bean Blossum Bottom	BBB0503	Ostracoda	13		Crustacea	Ostracodaa			
Bean Blossum Bottom	BBB0505	Ostracoda	1		Crustacea	Ostracodaa			
Bean Blossum Bottom	BBB0513	Ostracoda	3		Crustacea	Ostracodaa			
Bean Blossum Bottom	BBB0526	Ostracoda	1		Crustacea	Ostracodaa			
Bean Blossum Bottom	BBB0539	Ostracoda	1		Crustacea	Ostracodaa			
Bean Blossum Bottom	BBB0540	Ostracoda	2		Crustacea	Ostracodaa			
Bean Blossum Bottom	BBB0547	Ostracoda	9		Crustacea	Ostracodaa			
Bean Blossum Bottom	BBB0548	Ostracoda	1		Crustacea	Ostracodaa			
Bean Blossum Bottom	BBB0550	Ostracoda	9		Crustacea	Ostracodaa			
Bean Blossum Bottom	BBB0551	Ostracoda	1		Crustacea	Ostracodaa			
Bean Blossum Bottom	BBB0553	Ostracoda	2		Crustacea	Ostracodaa			
Bean Blossum Bottom	BBB0554	Ostracoda	30		Crustacea	Ostracodaa			
Bean Blossum Bottom	BBB0555	Ostracoda	4		Crustacea	Ostracodaa			
Bean Blossum Bottom	BBB0558	Ostracoda	2		Crustacea	Ostracodaa			
Potowatami Nature Preserve	PNP0601	Ostracoda	8		Crustacea	Ostracodaa			
Potowatami Nature Preserve	PNP0604	Ostracoda	4		Crustacea	Ostracodaa			
Potowatami Nature Preserve	PNP0606	Ostracoda	1		Crustacea	Ostracodaa			
Potowatami Nature Preserve	PNP0607	Ostracoda	5		Crustacea	Ostracodaa			
Potowatami Nature Preserve	PNP0610	Ostracoda	1		Crustacea	Ostracodaa			
Potowatami Nature Preserve	PNP0611	Ostracoda	2		Crustacea	Ostracodaa			
Potowatami Nature Preserve	PNP0613	Ostracoda	1		Crustacea	Ostracodaa			
Potowatami Nature Preserve	PNP0614	Ostracoda	3		Crustacea	Ostracodaa			

Table C-4. Non crayfish burrow co-inhabitants continued.									
Site name	**Burrow name**	**Organism**	**Number**	**Scientific name**	**Class**	**Order**	**Family**	**Comment**	**Group totals**
Potowatami Nature Preserve	PNP0616	Ostracoda	17		Crustacea	Ostracodaa			
Potowatami Nature Preserve	PNP0620	Ostracoda	1		Crustacea	Ostracodaa			
Potowatami Nature Preserve	PNP0622	Ostracoda	3		Crustacea	Ostracodaa			
Potowatami Nature Preserve	PNP0626	Ostracoda	4		Crustacea	Ostracodaa			
Potowatami Nature Preserve	PNP0629	Ostracoda	10		Crustacea	Ostracodaa			
Potowatami Nature Preserve	PNP0631	Ostracoda	1		Crustacea	Ostracodaa			
Potowatami Nature Preserve	PNP0632	Ostracoda	1		Crustacea	Ostracodaa			
Potowatami Nature Preserve	PNP0635	Ostracoda	2		Crustacea	Ostracodaa			
Summit Lake	SL0604	Ostracoda	2		Crustacea	Ostracodaa			
Summit Lake	SL0606	Ostracoda	2		Crustacea	Ostracodaa			
Summit Lake	SL0613	Ostracoda	14		Crustacea	Ostracodaa			
Summit Lake	SL0614	Ostracoda	1		Crustacea	Ostracodaa			
Summit Lake	SL0617	Ostracoda	2		Crustacea	Ostracodaa			
Summit Lake	SL0619	Ostracoda	3		Crustacea	Ostracodaa			
Summit Lake	SL0620	Ostracoda	1		Crustacea	Ostracodaa			
Summit Lake	SL0622	Ostracoda	1		Crustacea	Ostracodaa			
Summit Lake	SL0625	Ostracoda	15		Crustacea	Ostracodaa			
Summit Lake	SL0626	Ostracoda	5		Crustacea	Ostracodaa			
Summit Lake	SL0628	Ostracoda	79		Crustacea	Ostracodaa			
Summit Lake	SL0629	Ostracoda	30		Crustacea	Ostracodaa			
Summit Lake	SL0630	Ostracoda	26		Crustacea	Ostracodaa			
Summit Lake	SL0631	Ostracoda	84		Crustacea	Ostracodaa			
Summit Lake	SL0632	Ostracoda	24		Crustacea	Ostracodaa			
Summit Lake	SL0633	Ostracoda	8		Crustacea	Ostracodaa			
Summit Lake	SL0634	Ostracoda	11		Crustacea	Ostracodaa			
Summit Lake	SL0635	Ostracoda	1		Crustacea	Ostracodaa			
Summit Lake	SL0636	Ostracoda	7		Crustacea	Ostracodaa			
Fallin Timber	FT0606	Ostracoda	2		Crustacea	Ostracodaa			
Fallin Timber	FT0608	Ostracoda	1		Crustacea	Ostracodaa			
Fallin Timber	FT0611	Ostracoda	1		Crustacea	Ostracodaa			
Fallin Timber	FT0612	Ostracoda	1		Crustacea	Ostracodaa			

Table C-4. Non crayfish burrow co-inhabitants continued.									
Site name	**Burrow name**	**Organism**	**Number**	**Scientific name**	**Class**	**Order**	**Family**	**Comment**	**Group totals**
Fallin Timber	FT0613	Ostracoda	3		Crustacea	Ostracodaa			655
Hoosier Prairie	RFT-04-89-10	Millipede	1		Diplopoda	Chordeumatida	Caseyidae?		
Hoosier Prairie	RFT-04-89-17	Millipede	1		Diplopoda	Chordeumatida	Caseyidae?		
Turkey Run	RFT-04-46-1	Millipede	1		Diplopoda	Chordeumatida	Caseyidae?		
Turkey Run	RFT-04-46-10	Millipede	1		Diplopoda	Chordeumatida	Caseyidae?		
Turkey Run	RFT-04-46-6	Millipede	1		Diplopoda	Chordeumatida	Caseyidae?		
Hoosier Prairie	RFT-04-89-5	Millipede	1		Diplopoda	Chordeumatida	Caseyidae?		
Hoosier Prairie	RFT-04-89-9	Millipede	3		Diplopoda	Chordeumatida	Caseyidae?		
Turkey Run	TR0506	Millipede	1		Diplopoda	Chordeumatida	Caseyidae?		
Turkey Run	TR0509	Millipede	2		Diplopoda	Chordeumatida	Caseyidae?		
Summit Lake	SL0612	Millipede	1		Diplopoda	Chordeumatida	Caseyidae?		
Summit Lake	SL0613	Millipede	1		Diplopoda	Chordeumatida	Caseyidae?		
Fallin Timber	FT0603	millepeid	1		Diplopoda	Chordeumatida	Caseyidae?		
Fallin Timber	FT0603	millepeid body part	1		Diplopoda	Chordeumatida	Caseyidae?		19
Turkey Run	RFT-04-88-20	ground beetle adult	1		Insecta	Coleoptera	Carabidae		
Twin Swamps	RFT-04-44-8	ground beetle adult	1		Insecta	Coleoptera	Carabidae		
Hoosier Prairie	HP200514	Carabidae	1		Insecta	Coleoptera	Carabidae		
Bloomfield Barrens	BFB0513	ground beetle adult	4		Insecta	Coleoptera	Carabidae		
Bloomfield Barrens	BFB0508	tiger beetle part	1		Insecta	Coleoptera	Cicindelidae		
Summit Lake	SL0622	tiger beetle body part	1		Insecta	Coleoptera	Cicindelidae		
Summit Lake	SL0632	tiger beetle body part	1		Insecta	Coleoptera	Cicindelidae		
Bloomfield Barrens	BFB0511	fringe-winged beetle	1	Clambidae	Insecta	Coleoptera	Clambidae		
Hoosier Prairie	RFT-04-45-10	Dytiscidae	1		Insecta	Coleoptera	Dytiscidae		
Hoosier Prairie	HP200514	Hydrophilidae	1		Insecta	Coleoptera	Hydrophilidae		
Fallin Timber	FT0644	Hydrophilidae	1		Insecta	Coleoptera	Hydrophilidae		
Bloomfield Barrens	BFB0511	Rove beetle	2	Staphylinidae	Insecta	Coleoptera	Staphylinidae		
Bloomfield Barrens	BFB0512	Rove beetle	1	Staphylinidae	Insecta	Coleoptera	Staphylinidae		
Bloomfield Barrens	BFB0514	Rove beetle	1	Staphylinidae	Insecta	Coleoptera	Staphylinidae		
Bloomfield Barrens	BFB0520b	Rove beetle	1		Insecta	Coleoptera	Staphylinidae		
Turkey Run	RFT-04-88-13	beetle larvae	1		Insecta	Coleoptera			
Turkey Run	RFT-04-88-15	beetle larvae	1		Insecta	Coleoptera			

Table C-4. Non crayfish burrow co-inhabitants continued.									
Site name	**Burrow name**	**Organism**	**Number**	**Scientific name**	**Class**	**Order**	**Family**	**Comment**	**Group totals**
Turkey Run	RFT-04-88-20	beetle larvae	1		Insecta	Coleoptera			
Turkey Run	RFT-04-88-3	beetle larvae	1		Insecta	Coleoptera			
Turkey Run	RFT-04-88-6	beetle adult	1		Insecta	Coleoptera			
Hoosier Prairie	RFT-04-45-1	beetle adult	1		Insecta	Coleoptera			
Hoosier Prairie	RFT-04-45-11	beetle adult	1		Insecta	Coleoptera			
Hoosier Prairie	RFT-04-45-14	beetle larvae	2		Insecta	Coleoptera			
Hoosier Prairie	RFT-04-45-20	beetle body part	1		Insecta	Coleoptera			
Hoosier Prairie	RFT-04-89-10	beetle adult	1		Insecta	Coleoptera			
Hoosier Prairie	RFT-04-89-17	beetle larvae	1		Insecta	Coleoptera			
Hoosier Prairie	RFT-04-89-6	beetle adult	1		Insecta	Coleoptera			
Hoosier Prairie	HP200501	beetle larvae	2		Insecta	Coleoptera			
Hoosier Prairie	HP200502	beetle larvae	1		Insecta	Coleoptera			
Hoosier Prairie	HP200512	beetle larvae	1		Insecta	Coleoptera			
Twin Swamps	TS0503	beetle larvae	1		Insecta	Coleoptera			
Twin Swamps	TS0512	beetle larvae	1		Insecta	Coleoptera			
Turkey Run	TR0505	beetle larvae	1		Insecta	Coleoptera			
Bloomfield Barrens	BFB0511	beetle body part	1		Insecta	Coleoptera			
Bloomfield Barrens	BFB0512b	beetle larvae	2		Insecta	Coleoptera			
Bloomfield Barrens	BFB0513b	beetle body part	1		Insecta	Coleoptera			
Bloomfield Barrens	BFB0513b	beetle pupae	1		Insecta	Coleoptera			
Bloomfield Barrens	BFB0516	beetle larvae	2		Insecta	Coleoptera			
Bloomfield Barrens	BFB0523	beetle larvae	1		Insecta	Coleoptera			
Bloomfield Barrens	BFB0532	beetle larvae	1		Insecta	Coleoptera			
Bean Blossum Bottom	BBB0510	beetle larvae	3		Insecta	Coleoptera			
Bean Blossum Bottom	BBB0513	beetle larvae	2		Insecta	Coleoptera			
Bean Blossum Bottom	BBB0518	beetle	1		Insecta	Coleoptera			
Bean Blossum Bottom	BBB0518	beetle body part	3		Insecta	Coleoptera			
Bean Blossum Bottom	BBB0529	beetle larvae	2		Insecta	Coleoptera			
Bean Blossum Bottom	BBB0532	beetle larvae	1		Insecta	Coleoptera			
Bean Blossum Bottom	BBB0538	beetle larvae	1		Insecta	Coleoptera			
Bean Blossum Bottom	BBB0553	beetle larvae	2		Insecta	Coleoptera			

Table C-4. Non crayfish burrow co-inhabitants continued.									
Site name	**Burrow name**	**Organism**	**Number**	**Scientific name**	**Class**	**Order**	**Family**	**Comment**	**Group totals**
Bean Blossum Bottom	BBB0556	beetle larvae	1		Insecta	Coleoptera			
Potowatami Nature Preserve	PNP0623	beetle larvae	1		Insecta	Coleoptera			
Summit Lake	SL0602	beetle body part	1		Insecta	Coleoptera			
Summit Lake	SL0605	beetle body part	1		Insecta	Coleoptera			
Summit Lake	SL0608	beetle body part	1		Insecta	Coleoptera			
Summit Lake	SL0614	beetle larvae	1		Insecta	Coleoptera			
Summit Lake	SL0614	beetle body part	1		Insecta	Coleoptera			
Summit Lake	SL0616	beetle larvae	3		Insecta	Coleoptera			
Summit Lake	SL0618	beetle larvae	1		Insecta	Coleoptera			
Fallin Timber	FT0622	beetle larvae	1		Insecta	Coleoptera			
Fallin Timber	FT0623	beetle	1		Insecta	Coleoptera			
Fallin Timber	FT0629	beetle larvae	1		Insecta	Coleoptera			
Fallin Timber	FT0631	beetle	3		Insecta	Coleoptera			
Fallin Timber	FT0634	beetle larvae	1		Insecta	Coleoptera			
Fallin Timber	FT0634	beetle	2		Insecta	Coleoptera			
Fallin Timber	FT0635	beetle	1		Insecta	Coleoptera			
Fallin Timber	FT0639	beetle	1		Insecta	Coleoptera			
Fallin Timber	FT0645	Colioptera aquatic	1		Insecta	Colioptera			85
Turkey Run	RFT-04-88-15	springtail	4		Insecta	Collembola			
Turkey Run	RFT-04-88-16	springtail	4		Insecta	Collembola			
Turkey Run	RFT-04-88-17	springtail	3		Insecta	Collembola			
Turkey Run	RFT-04-88-3	springtail	8		Insecta	Collembola			
Turkey Run	RFT-04-88-4	springtail	1		Insecta	Collembola			
Turkey Run	RFT-04-88-6	springtail	6		Insecta	Collembola			
Hoosier Prairie	RFT-04-45-8	springtail	3		Insecta	Collembola			
Hoosier Prairie	RFT-04-89-10	springtail	2		Insecta	Collembola			
Hoosier Prairie	RFT-04-89-16	springtail	1		Insecta	Collembola			
Twin Swamps	RFT-04-44-1	springtail	1		Insecta	Collembola			
Twin Swamps	RFT-04-44-10	springtail	2		Insecta	Collembola			
Twin Swamps	RFT-04-44-11	springtail	1		Insecta	Collembola			
Twin Swamps	RFT-04-44-7	springtail	1		Insecta	Collembola			

Table C-4. Non crayfish burrow co-inhabitants continued.									
Site name	**Burrow name**	**Organism**	**Number**	**Scientific name**	**Class**	**Order**	**Family**	**Comment**	**Group totals**
Twin Swamps	RFT-04-44-9	springtail	1		Insecta	Collembola			
Twin Swamps	RFT-04-87-14	springtail	6		Insecta	Collembola			
Twin Swamps	RFT-04-87-2	springtail	1		Insecta	Collembola			
Turkey Run	RFT-04-46-10	springtail	2		Insecta	Collembola			
Turkey Run	RFT-04-46-11	springtail	1		Insecta	Collembola			
Turkey Run	RFT-04-46-2	springtail	2		Insecta	Collembola			
Turkey Run	RFT-04-46-3	springtail	1		Insecta	Collembola			
Turkey Run	RFT-04-46-4	springtail	2		Insecta	Collembola			
Turkey Run	RFT-04-46-6	springtail	1		Insecta	Collembola			
Turkey Run	RFT-04-46-8	springtail	4		Insecta	Collembola			
Hoosier Prairie	RFT-04-89-17	springtail	2		Insecta	Collembola			
Hoosier Prairie	RFT-04-89-21	springtail	1		Insecta	Collembola			
Hoosier Prairie	RFT-04-89-22	springtail	1		Insecta	Collembola			
Hoosier Prairie	RFT-04-89-24	springtail	2		Insecta	Collembola			
Hoosier Prairie	RFT-04-89-5	springtail	2		Insecta	Collembola			
Hoosier Prairie	RFT-04-89-7	springtail	1		Insecta	Collembola			
Hoosier Prairie	HP200502	springtail	1		Insecta	Collembola			
Hoosier Prairie	HP200507	springtail	6		Insecta	Collembola			
Hoosier Prairie	HP200509	springtail	1		Insecta	Collembola			
Hoosier Prairie	HP200510	springtail	1		Insecta	Collembola			
Hoosier Prairie	HP200511	springtail	1		Insecta	Collembola			
Twin Swamps	TS0505	springtail	2		Insecta	Collembola			
Twin Swamps	TS0508	springtail	2		Insecta	Collembola			
Twin Swamps	TS0510	springtail	1		Insecta	Collembola			
Twin Swamps	TS0511	springtail	15		Insecta	Collembola			
Twin Swamps	TS0512	springtail	4		Insecta	Collembola			
Twin Swamps	TS0513	springtail	6		Insecta	Collembola			
Turkey Run	TR0504	springtail	1		Insecta	Collembola			
Turkey Run	TR0505	springtail	1		Insecta	Collembola			
Bloomfield Barrens	BFB0501	springtail	4		Insecta	Collembola			
Bloomfield Barrens	BFB0504	springtail	3		Insecta	Collembola			

Table C-4. Non crayfish burrow co-inhabitants continued.									
Site name	**Burrow name**	**Organism**	**Number**	**Scientific name**	**Class**	**Order**	**Family**	**Comment**	**Group totals**
Bloomfield Barrens	BFB0505	springtail	1		Insecta	Collembola			
Bloomfield Barrens	BFB0506	springtail	5		Insecta	Collembola			
Bloomfield Barrens	BFB0507	springtail	5		Insecta	Collembola			
Bloomfield Barrens	BFB0508	springtail	1		Insecta	Collembola			
Bloomfield Barrens	BFB0509	springtail	1		Insecta	Collembola			
Bloomfield Barrens	BFB0510	springtail	2		Insecta	Collembola			
Bloomfield Barrens	BFB0511	springtail	6		Insecta	Collembola			
Bloomfield Barrens	BFB0512	springtail	10		Insecta	Collembola			
Bloomfield Barrens	BFB0513	springtail	14		Insecta	Collembola			
Bloomfield Barrens	BFB0514	springtail	4		Insecta	Collembola			
Bloomfield Barrens	BFB0515	springtail	3		Insecta	Collembola			
Bloomfield Barrens	BFB0511b	springtail	3		Insecta	Collembola			
Bloomfield Barrens	BFB0512b	springtail	4		Insecta	Collembola			
Bloomfield Barrens	BFB0516	springtail	2		Insecta	Collembola			
Bloomfield Barrens	BFB0517	springtail	1		Insecta	Collembola			
Bloomfield Barrens	BFB0518	springtail	1		Insecta	Collembola			
Bloomfield Barrens	BFB0521	springtail	2		Insecta	Collembola			
Bloomfield Barrens	BFB0520b	springtail	16		Insecta	Collembola			
Bloomfield Barrens	BFB0523	springtail	1		Insecta	Collembola			
Bloomfield Barrens	BFB0528	springtail	2		Insecta	Collembola			
Bloomfield Barrens	BFB0529	springtail	7		Insecta	Collembola			
Bloomfield Barrens	BFB0532	springtail	2		Insecta	Collembola			
Bean Blossum Bottom	BBB0502	springtail	1		Insecta	Collembola			
Bean Blossum Bottom	BBB0504	springtail	4		Insecta	Collembola			
Bean Blossum Bottom	BBB0505	springtail	1		Insecta	Collembola			
Bean Blossum Bottom	BBB0506	springtail	4		Insecta	Collembola			
Bean Blossum Bottom	BBB0507	springtail	2		Insecta	Collembola			
Bean Blossum Bottom	BBB0510	springtail	4		Insecta	Collembola			
Bean Blossum Bottom	BBB0511	springtail	3		Insecta	Collembola			
Bean Blossum Bottom	BBB0513	springtail	1		Insecta	Collembola			
Bean Blossum Bottom	BBB0514	springtail	4		Insecta	Collembola			

Table C-4. Non crayfish burrow co-inhabitants continued.									
Site name	**Burrow name**	**Organism**	**Number**	**Scientific name**	**Class**	**Order**	**Family**	**Comment**	**Group totals**
Bean Blossum Bottom	BBB0515	springtail	3		Insecta	Collembola			
Bean Blossum Bottom	BBB0516	springtail	2		Insecta	Collembola			
Bean Blossum Bottom	BBB0518	springtail	1		Insecta	Collembola			
Bean Blossum Bottom	BBB0520	springtail	3		Insecta	Collembola			
Bean Blossum Bottom	BBB0545	springtail	1		Insecta	Collembola			
Bean Blossum Bottom	BBB0548	springtail	1		Insecta	Collembola			
Bean Blossum Bottom	BBB0556	springtail	2		Insecta	Collembola			
Potowatami Nature Preserve	PNP0601	springtail	1		Insecta	Collembola			
Potowatami Nature Preserve	PNP0603	springtail	3		Insecta	Collembola			
Potowatami Nature Preserve	PNP0605	springtail	1		Insecta	Collembola			
Potowatami Nature Preserve	PNP0606	springtail	1		Insecta	Collembola			
Potowatami Nature Preserve	PNP0607	springtail	1		Insecta	Collembola			
Potowatami Nature Preserve	PNP0610	springtail	7		Insecta	Collembola			
Potowatami Nature Preserve	PNP0611	springtail	1		Insecta	Collembola			
Potowatami Nature Preserve	PNP0612	springtail	1		Insecta	Collembola			
Potowatami Nature Preserve	PNP0614	springtail	3		Insecta	Collembola			
Potowatami Nature Preserve	PNP0615	springtail	1		Insecta	Collembola			
Potowatami Nature Preserve	PNP0619	springtail	2		Insecta	Collembola			
Potowatami Nature Preserve	PNP0620	springtail	4		Insecta	Collembola			
Potowatami Nature Preserve	PNP0621	springtail	2		Insecta	Collembola			
Potowatami Nature Preserve	PNP0623	springtail	1		Insecta	Collembola			
Potowatami Nature Preserve	PNP0624	springtail	4		Insecta	Collembola			
Potowatami Nature Preserve	PNP0625	springtail	1		Insecta	Collembola			
Potowatami Nature Preserve	PNP0629	springtail	5		Insecta	Collembola			
Potowatami Nature Preserve	PNP0630	springtail	1		Insecta	Collembola			
Potowatami Nature Preserve	PNP0631	springtail	4		Insecta	Collembola			
Potowatami Nature Preserve	PNP0632	springtail	3		Insecta	Collembola			
Potowatami Nature Preserve	PNP0633	springtail	3		Insecta	Collembola			
Potowatami Nature Preserve	PNP0634	springtail	4		Insecta	Collembola			
Potowatami Nature Preserve	PNP0637	springtail	11		Insecta	Collembola			
Potowatami Nature Preserve	PNP0638	springtail	3		Insecta	Collembola			

Table C-4. Non crayfish burrow co-inhabitants continued.									
Site name	Burrow name	Organism	Number	Scientific name	Class	Order	Family	Comment	Group totals
Summit Lake	SL0602	springtail	1		Insecta	Collembola			
Summit Lake	SL0603	springtail	1		Insecta	Collembola			
Summit Lake	SL0604	springtail	1		Insecta	Collembola			
Summit Lake	SL0605	springtail	1		Insecta	Collembola			
Summit Lake	SL0606	springtail	1		Insecta	Collembola			
Summit Lake	SL0611	springtail	1		Insecta	Collembola			
Summit Lake	SL0614	springtail	5		Insecta	Collembola			
Summit Lake	SL0615	springtail	3		Insecta	Collembola			
Summit Lake	SL0616	springtail	2		Insecta	Collembola			
Summit Lake	SL0617	springtail	1		Insecta	Collembola			
Summit Lake	SL0618	springtail	1		Insecta	Collembola			
Summit Lake	SL0619	springtail	1		Insecta	Collembola			
Summit Lake	SL0620	springtail	26		Insecta	Collembola			
Summit Lake	SL0621	springtail	2		Insecta	Collembola			
Summit Lake	SL0622	springtail	1		Insecta	Collembola			
Summit Lake	SL0623	springtail	2		Insecta	Collembola			
Summit Lake	SL0625	springtail	4		Insecta	Collembola			
Summit Lake	SL0627	springtail	1		Insecta	Collembola			
Summit Lake	SL0628	springtail	12		Insecta	Collembola			
Summit Lake	SL0629	springtail	1		Insecta	Collembola			
Summit Lake	SL0631	springtail	15		Insecta	Collembola			
Summit Lake	SL0632	springtail	2		Insecta	Collembola			
Summit Lake	SL0633	springtail	15		Insecta	Collembola			
Summit Lake	SL0634	springtail	1		Insecta	Collembola			
Summit Lake	SL0635	springtail	5		Insecta	Collembola			
Summit Lake	SL0636	springtail	2		Insecta	Collembola			
Summit Lake	SL0637	springtail	2		Insecta	Collembola			
Summit Lake	SL0638	springtail	1		Insecta	Collembola			
Summit Lake	SL0639	springtail	5		Insecta	Collembola			
Fallin Timber	FT0603	springtail	1		Insecta	Collembola			
Fallin Timber	FT0625	springtail	2		Insecta	Collembola			

Table C-4. Non crayfish burrow co-inhabitants continued.									
Site name	**Burrow name**	**Organism**	**Number**	**Scientific name**	**Class**	**Order**	**Family**	**Comment**	**Group totals**
Fallin Timber	FT0631	springtail	2		Insecta	Collembola			
Fallin Timber	FT0632	springtail	1		Insecta	Collembola			
Fallin Timber	FT0633	springtail	2		Insecta	Collembola			
Fallin Timber	FT0636	springtail	2		Insecta	Collembola			
Fallin Timber	FT0637	springtail	1		Insecta	Collembola			
Fallin Timber	FT0646	springtail	2		Insecta	Collembola			
Fallin Timber	FT0648	springtail	1		Insecta	Collembola			408
Turkey Run	RFT-04-88-13	midge larvae	2		Insecta	Diptera	Chironomidae		
Turkey Run	RFT-04-88-15	midge larvae	5		Insecta	Diptera	Chironomidae		
Turkey Run	RFT-04-88-16	midge larvae	17		Insecta	Diptera	Chironomidae		
Turkey Run	RFT-04-88-3	midge larvae	3		Insecta	Diptera	Chironomidae		
Turkey Run	RFT-04-88-4	midge larvae type2	2		Insecta	Diptera	Chironomidae		
Turkey Run	RFT-04-88-4	midge larvae	15		Insecta	Diptera	Chironomidae		
Turkey Run	RFT-04-88-5	midge larvae	2		Insecta	Diptera	Chironomidae		
Hoosier Prairie	RFT-04-45-14	midge pupae	1		Insecta	Diptera	Chironomidae		
Hoosier Prairie	RFT-04-45-14	midge larvae	1		Insecta	Diptera	Chironomidae		
Hoosier Prairie	RFT-04-45-18	midge larvae	1		Insecta	Diptera	Chironomidae		
Hoosier Prairie	RFT-04-45-4	midge larvae	1		Insecta	Diptera	Chironomidae		
Hoosier Prairie	RFT-04-89-10	midge adult	1		Insecta	Diptera	Chironomidae		
Twin Swamps	RFT-04-44-1	midge larvae	1		Insecta	Diptera	Chironomidae		
Twin Swamps	RFT-04-44-11	midge larvae	1		Insecta	Diptera	Chironomidae		
Twin Swamps	RFT-04-44-4	midge larvae	2		Insecta	Diptera	Chironomidae		
Twin Swamps	RFT-04-87-11	midge larvae	1		Insecta	Diptera	Chironomidae		
Twin Swamps	RFT-04-87-12	midge larvae	2		Insecta	Diptera	Chironomidae		
Twin Swamps	RFT-04-87-13	midge larvae	8		Insecta	Diptera	Chironomidae		
Turkey Run	RFT-04-46-1	midge larvae	46		Insecta	Diptera	Chironomidae		
Turkey Run	RFT-04-46-11	midge larvae	1		Insecta	Diptera	Chironomidae		
Turkey Run	RFT-04-46-2	midge larvae	1		Insecta	Diptera	Chironomidae		
Turkey Run	RFT-04-46-4	midge larvae	5		Insecta	Diptera	Chironomidae		
Turkey Run	RFT-04-46-5	midge larvae	1		Insecta	Diptera	Chironomidae		
Hoosier Prairie	RFT-04-89-22	midge larvae	1		Insecta	Diptera	Chironomidae		

Table C-4. Non crayfish burrow co-inhabitants continued.									
Site name	**Burrow name**	**Organism**	**Number**	**Scientific name**	**Class**	**Order**	**Family**	**Comment**	**Group totals**
Hoosier Prairie	RFT-04-89-9	midge adult (2 sp.)	2		Insecta	Diptera	Chironomidae		
Hoosier Prairie	HP200502	midge adult	1		Insecta	Diptera	Chironomidae		
Hoosier Prairie	HP200504	midge larvae	1		Insecta	Diptera	Chironomidae		
Hoosier Prairie	HP200505	midge exuvia	1		Insecta	Diptera	Chironomidae		
Hoosier Prairie	HP200506	midge larvae	4		Insecta	Diptera	Chironomidae		
Hoosier Prairie	HP200506	midge adult	1		Insecta	Diptera	Chironomidae		
Hoosier Prairie	HP200509	midge pupae	1		Insecta	Diptera	Chironomidae		
Hoosier Prairie	HP200511	midge adult	1		Insecta	Diptera	Chironomidae		
Hoosier Prairie	HP200512	midge larvae	1		Insecta	Diptera	Chironomidae		
Hoosier Prairie	HP200513	midge exuvia	2		Insecta	Diptera	Chironomidae		
Hoosier Prairie	HP200514	midge larvae	1		Insecta	Diptera	Chironomidae		
Twin Swamps	TS0511	midge pupae	1		Insecta	Diptera	Chironomidae		
Turkey Run	TR0502	midge pupae	1		Insecta	Diptera	Chironomidae		
Turkey Run	TR0504	midge larvae	3		Insecta	Diptera	Chironomidae		
Turkey Run	TR0504	midge pupae	9		Insecta	Diptera	Chironomidae		
Turkey Run	TR0506	midge larvae	1		Insecta	Diptera	Chironomidae		
Bloomfield Barrens	BFB0506	midge larvae	1		Insecta	Diptera	Chironomidae		
Bloomfield Barrens	BFB0508	midge larvae	1		Insecta	Diptera	Chironomidae		
Bloomfield Barrens	BFB0511	midge larvae	4		Insecta	Diptera	Chironomidae		
Bloomfield Barrens	BFB0512	midge exuvia	2		Insecta	Diptera	Chironomidae		
Bloomfield Barrens	BFB0513b	midge larvae	1		Insecta	Diptera	Chironomidae		
Bloomfield Barrens	BFB0526	midge larvae	1		Insecta	Diptera	Chironomidae		
Bean Blossum Bottom	BBB0504	midge larvae	1		Insecta	Diptera	Chironomidae		
Bean Blossum Bottom	BBB0506	midge	1		Insecta	Diptera	Chironomidae		
Bean Blossum Bottom	BBB0511	midge pupae exuvia	1		Insecta	Diptera	Chironomidae		
Bean Blossum Bottom	BBB0513	midge	1		Insecta	Diptera	Chironomidae		
Bean Blossum Bottom	BBB0514	midge larvae	1		Insecta	Diptera	Chironomidae		
Bean Blossum Bottom	BBB0515	midge exuvia	1		Insecta	Diptera	Chironomidae		
Bean Blossum Bottom	BBB0517	midge	1		Insecta	Diptera	Chironomidae		
Bean Blossum Bottom	BBB0518	midge	1		Insecta	Diptera	Chironomidae		
Bean Blossum Bottom	BBB0520	midge larvae	1		Insecta	Diptera	Chironomidae		

Table C-4. Non crayfish burrow co-inhabitants continued.									
Site name	**Burrow name**	**Organism**	**Number**	**Scientific name**	**Class**	**Order**	**Family**	**Comment**	**Group totals**
Bean Blossum Bottom	BBB0520	midge pupae exuvia	1		Insecta	Diptera	Chironomidae		
Bean Blossum Bottom	BBB0520	midge pupae	1		Insecta	Diptera	Chironomidae		
Bean Blossum Bottom	BBB0524	midge pupae	1		Insecta	Diptera	Chironomidae		
Bean Blossum Bottom	BBB0547	midge larvae	10		Insecta	Diptera	Chironomidae		
Bean Blossum Bottom	BBB0547	midge larvae	3		Insecta	Diptera	Chironomidae		
Bean Blossum Bottom	BBB0548	midge	1		Insecta	Diptera	Chironomidae		
Bean Blossum Bottom	BBB0551	midge larvae	2		Insecta	Diptera	Chironomidae		
Bean Blossum Bottom	BBB0557	midge pupae	1		Insecta	Diptera	Chironomidae		
Bean Blossum Bottom	BBB0558	midge	1		Insecta	Diptera	Chironomidae		
Potowatami Nature Preserve	PNP0607	midge pupae	1		Insecta	Diptera	Chironomidae		
Potowatami Nature Preserve	PNP0608	midge larvae	2		Insecta	Diptera	Chironomidae		
Potowatami Nature Preserve	PNP0612	midge larvae	1		Insecta	Diptera	Chironomidae		
Potowatami Nature Preserve	PNP0613	midge larvae	1		Insecta	Diptera	Chironomidae		
Potowatami Nature Preserve	PNP0615	midge larvae	1		Insecta	Diptera	Chironomidae		
Potowatami Nature Preserve	PNP0616	midge larvae	1		Insecta	Diptera	Chironomidae		
Potowatami Nature Preserve	PNP0616	midge body part	1		Insecta	Diptera	Chironomidae		
Potowatami Nature Preserve	PNP0621	midge larvae	2		Insecta	Diptera	Chironomidae		
Potowatami Nature Preserve	PNP0622	midge larvae	3		Insecta	Diptera	Chironomidae		
Potowatami Nature Preserve	PNP0622	midge larvae	2		Insecta	Diptera	Chironomidae		
Potowatami Nature Preserve	PNP0622	midge pupae	1		Insecta	Diptera	Chironomidae		
Potowatami Nature Preserve	PNP0623	midge larvae	1		Insecta	Diptera	Chironomidae		
Potowatami Nature Preserve	PNP0624	midge larvae	2		Insecta	Diptera	Chironomidae		
Potowatami Nature Preserve	PNP0625	midge larvae	11	Chironomidae	Insecta	Diptera	Chironomidae		
Potowatami Nature Preserve	PNP0626	midge larvae	7	Chironmidae	Insecta	Diptera	Chironomidae		
Potowatami Nature Preserve	PNP0629	mini midge larvae	11		Insecta	Diptera	Chironomidae		
Potowatami Nature Preserve	PNP0630	midge larvae	4		Insecta	Diptera	Chironomidae		
Potowatami Nature Preserve	PNP0631	mini midge larvae	3		Insecta	Diptera	Chironomidae		
Potowatami Nature Preserve	PNP0632	midge larvae	1		Insecta	Diptera	Chironomidae		
Potowatami Nature Preserve	PNP0633	mini midge larvae	6		Insecta	Diptera	Chironomidae		
Potowatami Nature Preserve	PNP0633	midge larvae	2		Insecta	Diptera	Chironomidae		
Potowatami Nature Preserve	PNP0633	midge larvae	1		Insecta	Diptera	Chironomidae		

Table C-4. Non crayfish burrow co-inhabitants continued.									
Site name	**Burrow name**	**Organism**	**Number**	**Scientific name**	**Class**	**Order**	**Family**	**Comment**	**Group totals**
Potowatami Nature Preserve	PNP0634	mini midge larvae	2		Insecta	Diptera	Chironomidae		
Potowatami Nature Preserve	PNP0634	midge larvae	1		Insecta	Diptera	Chironomidae		
Potowatami Nature Preserve	PNP0635	midge larvae	1		Insecta	Diptera	Chironomidae		
Potowatami Nature Preserve	PNP0635	midge larvae	1		Insecta	Diptera	Chironomidae		
Potowatami Nature Preserve	PNP0637	midge larvae	1		Insecta	Diptera	Chironomidae		
Potowatami Nature Preserve	PNP0639	midge larvae	1		Insecta	Diptera	Chironomidae		
Potowatami Nature Preserve	PNP0639	midge larvae	5		Insecta	Diptera	Chironomidae		
Summit Lake	SL0618	midge pupae	1		Insecta	Diptera	Chironomidae		
Summit Lake	SL0619	midge larvae	2		Insecta	Diptera	Chironomidae		
Summit Lake	SL0619	midge larvae	1		Insecta	Diptera	Chironomidae		
Summit Lake	SL0620	midge larvae	1		Insecta	Diptera	Chironomidae		
Summit Lake	SL0621	midge larvae	1		Insecta	Diptera	Chironomidae		
Summit Lake	SL0627	midge larvae	1		Insecta	Diptera	Chironomidae		
Fallin Timber	FT0607	midge larvae	1		Insecta	Diptera	Chironomidae		
Fallin Timber	FT0611	midge larvae	1		Insecta	Diptera	Chironomidae		
Fallin Timber	FT0645	midge larvae	1		Insecta	Diptera	Chironomidae		
Turkey Run	RFT-04-46-4	mosquito larvae	1		Insecta	Diptera	Culicidae		
Twin Swamps	TS0511	mosquito pupae	1		Insecta	Diptera	Culicidae		
Fallin Timber	FT0627	mosquito larvae	3		Insecta	Diptera	Culicidae		
Fallin Timber	FT0639	mosquito pupae	2		Insecta	Diptera	Culicidae		285
Potowatami Nature Preserve	PNP0630	Ephydridae	1		Insecta	Diptera	Ephydridae		1
Fallin Timber	FT0615	Sciomyzidae	3	Sciomyzidae	Insecta	Diptera	Sciomyzidae		3
Potowatami Nature Preserve	PNP0625	soldier fly larvae	1	Stratiomyidae	Insecta	Diptera	Stratiomyidae		1
Hoosier Prairie	RFT-04-45-14	rattail magot	3		Insecta	Diptera	Syrphidae		3
Potowatami Nature Preserve	PNP0620	deer fly larvae	1	Tabanidae	Insecta	Diptera	Tabanidae		
Potowatami Nature Preserve	PNP0622	deer fly larvae	1	Tabanidae	Insecta	Diptera	Tabanidae		
Potowatami Nature Preserve	PNP0623	deer fly larvae	1	Tabanidae	Insecta	Diptera	Tabanidae		
Potowatami Nature Preserve	PNP0631	deer fly larvae	2	Tibanidae	Insecta	Diptera	Tabanidae		
Potowatami Nature Preserve	PNP0637	deer fly larvae	1	Tibanidae	Insecta	Diptera	Tabanidae		
Potowatami Nature Preserve	PNP0638	deer fly larvae	2	Tibanidae	Insecta	Diptera	Tabanidae		
Summit Lake	SL0602	deer fly larvae	1	Tibanidae	Insecta	Diptera	Tabanidae		

Table C-4. Non crayfish burrow co-inhabitants continued.									
Site name	**Burrow name**	**Organism**	**Number**	**Scientific name**	**Class**	**Order**	**Family**	**Comment**	**Group totals**
Summit Lake	SL0622	deer fly larvae	2	Tibanidae	Insecta	Diptera	Tabanidae		
Summit Lake	SL0632	deer fly larvae	1	Tibanidae	Insecta	Diptera	Tabanidae		
Summit Lake	SL0636	deer fly larvae	1	Tibanidae	Insecta	Diptera	Tabanidae		
Fallin Timber	FT0625	deer fly larvae	1	Tibanidae	Insecta	Diptera	Tabanidae		14
Potowatami Nature Preserve	PNP0607	bloodworm midge	69		Insecta	Diptera	Tendipedidae		69
Turkey Run	RFT-04-88-4	Crane fly larvae	1		Insecta	Diptera	Tipulidae		
Hoosier Prairie	RFT-04-45-10	Crane fly larvae	1		Insecta	Diptera	Tipulidae		
Hoosier Prairie	RFT-04-45-14	Crane fly larvae	2		Insecta	Diptera	Tipulidae		
Hoosier Prairie	RFT-04-45-5	Crane fly larvae	1		Insecta	Diptera	Tipulidae		
Hoosier Prairie	RFT-04-45-9	Crane fly larvae	1		Insecta	Diptera	Tipulidae		
Hoosier Prairie	RFT-04-89-14	Crane fly pupae	1		Insecta	Diptera	Tipulidae		
Twin Swamps	RFT-04-44-1	Crane fly larvae	1		Insecta	Diptera	Tipulidae		
Hoosier Prairie	HP200503	Crane fly larvae	2		Insecta	Diptera	Tipulidae		
Hoosier Prairie	HP200505	Crane fly larvae	2		Insecta	Diptera	Tipulidae		
Hoosier Prairie	HP200511	Crane fly larvae	2		Insecta	Diptera	Tipulidae		
Hoosier Prairie	HP200512	Crane fly larvae	1		Insecta	Diptera	Tipulidae		
Hoosier Prairie	HP200513	Crane fly adult	2		Insecta	Diptera	Tipulidae		
Hoosier Prairie	HP200514	Crane fly larvae	6		Insecta	Diptera	Tipulidae		
Twin Swamps	TS0509	Crane fly larvae	1		Insecta	Diptera	Tipulidae		
Twin Swamps	TS0511	Crane fly exuvia	1		Insecta	Diptera	Tipulidae		
Turkey Run	TR0503	Crane fly larvae	2		Insecta	Diptera	Tipulidae		
Turkey Run	TR0506	Crane fly larvae	2		Insecta	Diptera	Tipulidae		
Bloomfield Barrens	BFB0511	Crane fly larvae	2		Insecta	Diptera	Tipulidae		
Bloomfield Barrens	BFB0519b	Crane fly larvae	1		Insecta	Diptera	Tipulidae		
Bloomfield Barrens	BFB0520b	Crane fly larvae	12		Insecta	Diptera	Tipulidae		
Bloomfield Barrens	BFB0523	Crane fly larvae	1		Insecta	Diptera	Tipulidae		
Bloomfield Barrens	BFB0526	Crane fly larvae	1		Insecta	Diptera	Tipulidae		
Bloomfield Barrens	BFB0531	Crane fly larvae	1		Insecta	Diptera	Tipulidae		
Bean Blossum Bottom	BBB0511	Crane fly pupae	1		Insecta	Diptera	Tipulidae		
Bean Blossum Bottom	BBB0514	Crane fly larvae	1		Insecta	Diptera	Tipulidae		
Bean Blossum Bottom	BBB0518	Crane fly exuvia	1		Insecta	Diptera	Tipulidae		

Table C-4. Non crayfish burrow co-inhabitants continued.									
Site name	Burrow name	Organism	Number	Scientific name	Class	Order	Family	Comment	Group totals
Bean Blossum Bottom	BBB0529	Crane fly larvae	6		Insecta	Diptera	Tipulidae		
Bean Blossum Bottom	BBB0532	Crane fly larvae	1		Insecta	Diptera	Tipulidae		
Potowatami Nature Preserve	PNP0632	Crane fly larvae	1		Insecta	Diptera	Tipulidae		
Potowatami Nature Preserve	PNP0639	Crane fly larvae	1		Insecta	Diptera	Tipulidae		
Summit Lake	SL0608	Crane fly larvae	1		Insecta	Diptera	Tipulidae		
Fallin Timber	FT0602	Crane fly larvae	1		Insecta	Diptera	Tipulidae		61
Turkey Run	RFT-04-88-6	fly adult	1		Insecta	Diptera			
Hoosier Prairie	RFT-04-89-10	Diptera adult	1		Insecta	Diptera			
Twin Swamps	RFT-04-87-10	fly adult ??	2		Insecta	Diptera			
Turkey Run	TR0507	diptera pupae	1		Insecta	Diptera			
Turkey Run	TR0510	fly pupae	1		Insecta	Diptera			
Bloomfield Barrens	BFB0501	fly	1		Insecta	Diptera			
Bloomfield Barrens	BFB0513	fly	3		Insecta	Diptera			
Bean Blossum Bottom	BBB0511	fly	1		Insecta	Diptera			
Bean Blossum Bottom	BBB0550	fly	2		Insecta	Diptera			
Potowatami Nature Preserve	PNP0606	fly body part	1		Insecta	Diptera			
Potowatami Nature Preserve	PNP0613	fly body part	1		Insecta	Diptera			
Potowatami Nature Preserve	PNP0614	fly	1		Insecta	Diptera			
Potowatami Nature Preserve	PNP0626	fly wing	1		Insecta	Diptera			
Summit Lake	SL0601	fly adult	1		Insecta	Diptera			
Summit Lake	SL0614	fly larvae	2		Insecta	Diptera			
Summit Lake	SL0615	fly larvae	1		Insecta	Diptera			
Summit Lake	SL0617	fly larvae	1		Insecta	Diptera			
Summit Lake	SL0620	fly adult	1		Insecta	Diptera			
Summit Lake	SL0623	fly larvae	1		Insecta	Diptera			
Summit Lake	SL0628	diptera	1	Ceratopogonidae	Insecta	Diptera			
Summit Lake	SL0633	fly larvae	1		Insecta	Diptera			
Fallin Timber	FT0602	diptera larvae	1		Insecta	Diptera			
Fallin Timber	FT0603	fly pupae	1		Insecta	Diptera			
Fallin Timber	FT0603	fly larvae	1		Insecta	Diptera			
Fallin Timber	FT0608	fly larvae	2		Insecta	Diptera			

Table C-4. Non crayfish burrow co-inhabitants continued.									
Site name	**Burrow name**	**Organism**	**Number**	**Scientific name**	**Class**	**Order**	**Family**	**Comment**	**Group totals**
Fallin Timber	FT0615	fly larvae	1		Insecta	Diptera			
Fallin Timber	FT0616	fly larvae	1		Insecta	Diptera			33
Summit Lake	SL0622	mayfly	1	Caenidae	Insecta	Ephemeroptera	Caenidae		
Fallin Timber	FT0616	may fly	1	Thricorythidae	Insecta	Ephemeroptera	Thricorythidae		2
Hoosier Prairie	HP200511	Hemiptera	1		Insecta	Hemiptera			
Bloomfield Barrens	BFB0512	Hemiptera larvae	1	Hemiptera	Insecta	Hemiptera			
Bean Blossum Bottom	BBB0506	Hemiptera	1		Insecta	Hemiptera			
Bean Blossum Bottom	BBB0531	Hemiptera	1		Insecta	Hemiptera			
Summit Lake	SL0605	Hemiptera	3		Insecta	Hemiptera			
Summit Lake	SL0607	hemiptera exuvia	1		Insecta	Hemiptera			
Summit Lake	SL0616	Hemiptera	1		Insecta	Hemiptera			
Summit Lake	SL0619	Hemiptera exuvia	1		Insecta	Hemiptera			
Summit Lake	SL0621	Hemiptera	1		Insecta	Hemiptera			
Fallin Timber	FT0611	Hemiptera	1		Insecta	Hemiptera			
Fallin Timber	FT0637	Hemiptera	1		Insecta	Hemiptera			13
Turkey Run	RFT-04-88-19	aphid	1		Insecta	Homoptera	Aphididae		
Hoosier Prairie	RFT-04-45-20	aphid	1		Insecta	Homoptera	Aphididae		
Hoosier Prairie	RFT-04-89-7	aphid	2		Insecta	Homoptera	Aphididae		
Hoosier Prairie	HP200504	aphid	1		Insecta	Homoptera	Aphididae		
Twin Swamps	TS0512	aphid	1		Insecta	Homoptera	Aphididae		
Bloomfield Barrens	BFB0502	aphid	1		Insecta	Homoptera	Aphididae		
Bloomfield Barrens	BFB0519b	aphid	2		Insecta	Homoptera	Aphididae		
Bloomfield Barrens	BFB0526	aphid	1		Insecta	Homoptera	Aphididae		
Bean Blossum Bottom	BBB0509	aphid	1		Insecta	Homoptera	Aphididae		
Bean Blossum Bottom	BBB0509	aphid exuvia	1		Insecta	Homoptera	Aphididae		
Bean Blossum Bottom	BBB0511	aphid	1		Insecta	Homoptera	Aphididae		
Bean Blossum Bottom	BBB0519	aphid	1		Insecta	Homoptera	Aphididae		
Bean Blossum Bottom	BBB0520	aphid	1		Insecta	Homoptera	Aphididae		
Potowatami Nature Preserve	PNP0609	aphid	1		Insecta	Homoptera	Aphididae		
Potowatami Nature Preserve	PNP0612	aphid	1		Insecta	Homoptera	Aphididae		
Potowatami Nature Preserve	PNP0635	aphid	1		Insecta	Homoptera	Aphididae		

Table C-4. Non crayfish burrow co-inhabitants continued.									
Site name	**Burrow name**	**Organism**	**Number**	**Scientific name**	**Class**	**Order**	**Family**	**Comment**	**Group totals**
Summit Lake	SL0602	aphid	1		Insecta	Homoptera	Aphididae		
Summit Lake	SL0604	aphid	10		Insecta	Homoptera	Aphididae		
Summit Lake	SL0605	aphid	2		Insecta	Homoptera	Aphididae		
Summit Lake	SL0616	aphid	1		Insecta	Homoptera	Aphididae		
Summit Lake	SL0619	aphid	1		Insecta	Homoptera	Aphididae		
Summit Lake	SL0620	aphid	1		Insecta	Homoptera	Aphididae		
Summit Lake	SL0635	aphid	2		Insecta	Homoptera	Aphididae		
Fallin Timber	FT0643	aphid	1		Insecta	Homoptera	Aphididae		
Fallin Timber	FT0647	aphid	2		Insecta	Homoptera	Aphididae		21
Bean Blossum Bottom	BBB0513	Cicadidae larve	1		Insecta	Homoptera	Cicadidae		1
Bloomfield Barrens	BFB0519b	leafhopper	3		Insecta	Homoptera	Membracidae		
Bloomfield Barrens	BFB0531	leafhopper	1		Insecta	Homoptera	Membracidae		
Bean Blossum Bottom	BBB0503	leafhopper	1		Insecta	Homoptera	Membracidae		
Bean Blossum Bottom	BBB0503	leafhopper	1		Insecta	Homoptera	Membracidae		6
Bloomfield Barrens	BFB0510	Homoptera larvae	1		Insecta	Homoptera			
Bloomfield Barrens	BFB0513	Homoptera	1		Insecta	Homoptera			
Bloomfield Barrens	BFB0513	Homoptera	1		Insecta	Homoptera			
Bloomfield Barrens	BFB0514	Homoptera larvae	1		Insecta	Homoptera			
Bloomfield Barrens	BFB0516	Homoptera pupae	1		Insecta	Homoptera			
Bloomfield Barrens	BFB0527	Homoptera larvae	1		Insecta	Homoptera			
Bean Blossum Bottom	BBB0518	Homoptera	1		Insecta	Homoptera			
Bean Blossum Bottom	BBB0551	Homoptera	1		Insecta	Homoptera			
Bean Blossum Bottom	BBB0551	Homoptera exuvia	1		Insecta	Homoptera			
Potowatami Nature Preserve	PNP0639	Homoptera	1		Insecta	Homoptera			10
Turkey Run	RFT-04-88-4	ant	1		Insecta	Hymenoptera	Formicidae		
Turkey Run	RFT-04-88-5	ant	1		Insecta	Hymenoptera	Formicidae		
Twin Swamps	RFT-04-87-10	ant head	1		Insecta	Hymenoptera	Formicidae		
Hoosier Prairie	RFT-04-89-24	ant	1		Insecta	Hymenoptera	Formicidae		
Hoosier Prairie	RFT-04-89-9	ant	1		Insecta	Hymenoptera	Formicidae		
Hoosier Prairie	HP200510	ant	1		Insecta	Hymenoptera	Formicidae		
Bloomfield Barrens	BFB0503	ant	2		Insecta	Hymenoptera	Formicidae		

Table C-4. Non crayfish burrow co-inhabitants continued.									
Site name	**Burrow name**	**Organism**	**Number**	**Scientific name**	**Class**	**Order**	**Family**	**Comment**	**Group totals**
Bloomfield Barrens	BFB0507	ant	1		Insecta	Hymenoptera	Formicidae		
Bloomfield Barrens	BFB0510	ant	1		Insecta	Hymenoptera	Formicidae		
Bloomfield Barrens	BFB0512	ant	11		Insecta	Hymenoptera	Formicidae		
Bloomfield Barrens	BFB0513b	ant	2		Insecta	Hymenoptera	Formicidae		
Bloomfield Barrens	BFB0523	ant	6		Insecta	Hymenoptera	Formicidae		
Summit Lake	SL0602	ant	8	Brachymyrmex depilis	Insecta	Hymenoptera	Formicidae		
Summit Lake	SL0604	ant head	1		Insecta	Hymenoptera	Formicidae		
Summit Lake	SL0607	ant	1	B. depilis	Insecta	Hymenoptera	Formicidae		
Summit Lake	SL0608	ant	1	B. depilis	Insecta	Hymenoptera	Formicidae		
Summit Lake	SL0620	ant body part	1		Insecta	Hymenoptera	Formicidae		
Summit Lake	SL0622	ant	2	B. depilis	Insecta	Hymenoptera	Formicidae		
Summit Lake	SL0622	ant body part	1		Insecta	Hymenoptera	Formicidae		
Summit Lake	SL0623	ant body part	1		Insecta	Hymenoptera	Formicidae		
Summit Lake	SL0628	ant body part	3		Insecta	Hymenoptera	Formicidae		
Summit Lake	SL0637	ant body part	1		Insecta	Hymenoptera	Formicidae		
Fallin Timber	FT0623	ant	1	B. depilis	Insecta	Hymenoptera	Formicidae		
Fallin Timber	FT0636	ant	1	B. depilis	Insecta	Hymenoptera	Formicidae		
Fallin Timber	FT0639	ant	1	B. depilis	Insecta	Hymenoptera	Formicidae		
Fallin Timber	FT0645	ant	1	B. depilis	Insecta	Hymenoptera	Formicidae		
Fallin Timber	FT0648	ant	3	B. depilis	Insecta	Hymenoptera	Formicidae		55
Hoosier Prairie	RFT-04-89-10	Hymenoptera adult	1		Insecta	Hymenoptera			
Twin Swamps	RFT-04-87-1	Hymenoptera adult	1		Insecta	Hymenoptera			
Twin Swamps	RFT-04-87-10	Hymenoptera adult	1		Insecta	Hymenoptera			
Bloomfield Barrens	BFB0512b	Hymenoptera	1		Insecta	Hymenoptera			
Bloomfield Barrens	BFB0528	Hymenoptera	1		Insecta	Hymenoptera			
Potowatami Nature Preserve	PNP0620	Hymenoptera	1		Insecta	Hymenoptera			6
Twin Swamps	TS0511	termite	1		Insecta	Isoptera	Rhinotermitidae		1
Turkey Run	RFT-04-88-15	catepiller	1		Insecta	Lepidoptera			
Twin Swamps	TS0509	catepiller	1		Insecta	Lepidoptera			
Bean Blossum Bottom	BBB0518	cocoon	1		Insecta	Lepidoptera			
Bean Blossum Bottom	BBB0539	catapiller	1		Insecta	Lepidoptera			

Table C-4. Non crayfish burrow co-inhabitants continued.									
Site name	**Burrow name**	**Organism**	**Number**	**Scientific name**	**Class**	**Order**	**Family**	**Comment**	**Group totals**
Bean Blossum Bottom	BBB0548	catapiller	1		Insecta	Lepidoptera			
Summit Lake	SL0620	catapiller	1		Insecta	Lepidoptera			6
Bean Blossum Bottom	BBB0555	insect	1	Louse ?	Insecta	Mallophaga			
Potowatami Nature Preserve	PNP0629	insect	1	Mallophaga	Insecta	Mallophaga			
Potowatami Nature Preserve	PNP0630	insect	1	Mallophaga	Insecta	Mallophaga			3
Twin Swamps	RFT-04-44-6	earwig larvae ?	3		Insecta	Mecoptera	Meropeidae		
Hoosier Prairie	HP200513	earwig	2		Insecta	Mecoptera	Meropeidae		
Turkey Run	TR0503	earwig	1		Insecta	Mecoptera	Meropeidae		
Potowatami Nature Preserve	PNP0630	earwig	1		Insecta	Mecoptera	Meropeidae		
Potowatami Nature Preserve	PNP0632	earwig	1		Insecta	Mecoptera	Meropeidae		
Fallin Timber	FT0633	earwig	1		Insecta	Mecoptera	Meropeidae		
Fallin Timber	FT0637	earwig	1		Insecta	Mecoptera	Meropeidae		10
Summit Lake	SL0622	fish fly	2	Corydalidae	Insecta	Neuroptera	Corydalidae		2
Turkey Run	RFT-04-46-2	eastern gray clubtail	1	Tachopteryx thoreyi	Insecta	Odonata	Petaluridae		
Turkey Run	RFT-04-88-3	dragonfly larvae	1		Insecta	Odonata			
Turkey Run	RFT-04-88-5	dragonfly larvae	2		Insecta	Odonata			4
Bean Blossum Bottom	BBB0553	grasshopper body part	1		Insecta	Orthoptera	Acrididae		
Twin Swamps	RFT-04-44-8	camel cricket	1		Insecta	Orthoptera	Gryllacrididae		
Twin Swamps	RFT-04-87-12	camel cricket	1		Insecta	Orthoptera	Gryllacrididae		
Twin Swamps	RFT-04-87-14	camel cricket	2		Insecta	Orthoptera	Gryllacrididae		
Turkey Run	TR0504	camel cricket	1		Insecta	Orthoptera	Gryllacrididae		
Turkey Run	TR0507	camel cricket	1		Insecta	Orthoptera	Gryllacrididae		
Bloomfield Barrens	BFB0512b	camel cricket	1		Insecta	Orthoptera	Gryllacrididae		
Summit Lake	SL0632	camel cricket	1		Insecta	Orthoptera	Gryllacrididae		9
Turkey Run	RFT-04-46-5	stonefly larvae	1		Insecta	Plecoptera			1
Bloomfield Barrens	BFB0501	Pterygota	1		Insecta	Protura			1
Bean Blossum Bottom	BBB0525	Psocoptera	1		Insecta	Psocoptera			1
Bloomfield Barrens	BFB0528	thrip	1	Phleoethripidae	Insecta	Thysanoptera	Phleoethripidae		
Bean Blossum Bottom	BBB0525	thrip	1	Terebrantia	Insecta	Thysanoptera	Terebrantia		
Bloomfield Barrens	BFB0525	thrip	1	Thripidae	Insecta	Thysanoptera	Thripidae		
Bloomfield Barrens	BFB0506	thrip	1	Tubilifera	Insecta	Thysanoptera	Tubilifera		

Table C-4. Non crayfish burrow co-inhabitants continued.									
Site name	**Burrow name**	**Organism**	**Number**	**Scientific name**	**Class**	**Order**	**Family**	**Comment**	**Group totals**
Bloomfield Barrens	BFB0507	thrip	1	Tubilifera	Insecta	Thysanoptera	Tubilifera		
Hoosier Prairie	HP200511	thrip	1		Insecta	Thysanoptera			
Bloomfield Barrens	BFB0531	thrip larvae	1		Insecta	Thysanoptera			
Bean Blossum Bottom	BBB0501	thrip larvae	1		Insecta	Thysanoptera			
Bean Blossum Bottom	BBB0516	thrip	1		Insecta	Thysanoptera			
Bean Blossum Bottom	BBB0517	thrip	1		Insecta	Thysanoptera			
Potowatami Nature Preserve	PNP0611	thrip	1		Insecta	Thysanoptera			
Potowatami Nature Preserve	PNP0612	thrip	1		Insecta	Thysanoptera			
Summit Lake	SL0623	thrip	1		Insecta	Thysanoptera			
Summit Lake	SL0627	thrip	1		Insecta	Thysanoptera			
Summit Lake	SL0631	thrip	1		Insecta	Thysanoptera			11
Turkey Run	RFT-04-46-9	caddisfly case	2		Insecta	Tricoptera			1
Turkey Run	RFT-04-88-13	pupae ?fly?	1		Insecta				
Turkey Run	RFT-04-88-14	larvae ??	1		Insecta				
Turkey Run	RFT-04-88-16	pupae ??	1		Insecta				
Turkey Run	RFT-04-88-16	pupae ??	1		Insecta				
Turkey Run	RFT-04-88-19	larvae	1		Insecta				
Turkey Run	RFT-04-88-19	pupae	3		Insecta				
Turkey Run	RFT-04-88-20	pupae	1		Insecta				
Turkey Run	RFT-04-88-20	insect ??	1		Insecta				
Turkey Run	RFT-04-88-3	pupae case	1		Insecta				
Turkey Run	RFT-04-88-3	larvae ??	1		Insecta				
Turkey Run	RFT-04-88-4	larvae ??	2		Insecta				
Turkey Run	RFT-04-88-6	pupae ??	2		Insecta				
Turkey Run	RFT-04-88-6	insect ??	2		Insecta				
Turkey Run	RFT-04-88-6	larvae ??	6		Insecta				
Hoosier Prairie	RFT-04-45-14	pupae	2		Insecta				
Hoosier Prairie	RFT-04-45-16	insect larvae	1		Insecta				
Hoosier Prairie	RFT-04-45-2	larvae ??	1		Insecta				
Hoosier Prairie	RFT-04-45-5	larvae ??	2		Insecta				
Hoosier Prairie	RFT-04-45-9	pupae	1		Insecta				

Table C-4. Non crayfish burrow co-inhabitants continued.									
Site name	**Burrow name**	**Organism**	**Number**	**Scientific name**	**Class**	**Order**	**Family**	**Comment**	**Group totals**
Hoosier Prairie	RFT-04-89-10	larvae	8		Insecta				
Hoosier Prairie	RFT-04-89-11	pupae	5		Insecta				
Hoosier Prairie	RFT-04-89-12	pupae type2	1		Insecta				
Hoosier Prairie	RFT-04-89-12	pupae	2		Insecta				
Hoosier Prairie	RFT-04-89-13	pupae ??	4		Insecta				
Hoosier Prairie	RFT-04-89-14	larvae	1		Insecta				
Hoosier Prairie	RFT-04-89-17	larvae	1		Insecta				
Twin Swamps	RFT-04-44-11	leg	1		Insecta				
Twin Swamps	RFT-04-44-9	pupae ??	2		Insecta				
Twin Swamps	RFT-04-87-11	pupae	1		Insecta				
Turkey Run	RFT-04-46-1	pupae	1		Insecta				
Turkey Run	RFT-04-46-11	larvae ??	1		Insecta				
Turkey Run	RFT-04-46-11	insect larvae	1		Insecta				
Turkey Run	RFT-04-46-9	larvae ??	2		Insecta				
Hoosier Prairie	RFT-04-89-18	larvae	1		Insecta				
Hoosier Prairie	RFT-04-89-21	insect body parts	2		Insecta				
Hoosier Prairie	RFT-04-89-21	larvae	3		Insecta				
Hoosier Prairie	RFT-04-89-22	larvae ??	1		Insecta				
Hoosier Prairie	RFT-04-89-22	insect abdomen	1		Insecta				
Hoosier Prairie	RFT-04-89-24	larvae	3		Insecta				
Hoosier Prairie	RFT-04-89-24	larvae	4		Insecta				
Hoosier Prairie	RFT-04-89-5	instar ??	1		Insecta				
Hoosier Prairie	RFT-04-89-5	insect pupae	1		Insecta				
Hoosier Prairie	RFT-04-89-5	insect larvae	1		Insecta				
Hoosier Prairie	RFT-04-89-6	insect larvae (6sp)	8		Insecta				
Hoosier Prairie	RFT-04-89-7	instar	1		Insecta				
Hoosier Prairie	RFT-04-89-7	pupae	8		Insecta				
Hoosier Prairie	RFT-04-89-9	pupae	1		Insecta				
Hoosier Prairie	RFT-04-89-9	pupae	2		Insecta				
Hoosier Prairie	RFT-04-89-9	larvae	2		Insecta				
Hoosier Prairie	HP200502	insect pupae	1		Insecta				

Table C-4. Non crayfish burrow co-inhabitants continued.									
Site name	**Burrow name**	**Organism**	**Number**	**Scientific name**	**Class**	**Order**	**Family**	**Comment**	**Group totals**
Hoosier Prairie	HP200503	insect larvae	1		Insecta				
Hoosier Prairie	HP200505	insect?	1		Insecta				
Hoosier Prairie	HP200511	exuvia	9		Insecta				
Hoosier Prairie	HP200511	insect unknown	1		Insecta				
Hoosier Prairie	HP200512	pupae	1		Insecta				
Hoosier Prairie	HP200512	pupae exuvia	1		Insecta				
Hoosier Prairie	HP200513	pupae	1		Insecta				
Hoosier Prairie	HP200514	pupae	2		Insecta				
Twin Swamps	TS0504	insect	1		Insecta				
Twin Swamps	TS0511	larvae	1		Insecta				
Twin Swamps	TS0511	pupae	3		Insecta				
Twin Swamps	TS0511	insect larvae	1		Insecta				
Twin Swamps	TS0512	insect larvae	1		Insecta				
Twin Swamps	TS0513	insect	1		Insecta				
Twin Swamps	TS0513	pupae	1		Insecta				
Twin Swamps	TS0513	insect	1		Insecta				
Turkey Run	TR0503	insect larvae	1		Insecta				
Turkey Run	TR0506	pupae?	2		Insecta				
Turkey Run	TR0510	insect parts	1		Insecta				
Bloomfield Barrens	BFB0504	insect parts	3		Insecta				
Bloomfield Barrens	BFB0504	insect larvae	1		Insecta				
Bloomfield Barrens	BFB0508	insect exuvia	1		Insecta				
Bloomfield Barrens	BFB0510	pupae	2		Insecta				
Bloomfield Barrens	BFB0512	pupae	1		Insecta				
Bloomfield Barrens	BFB0513	pupae	2		Insecta				
Bloomfield Barrens	BFB0513	insect larvae	1		Insecta				
Bloomfield Barrens	BFB0513	insect exuvia	1		Insecta				
Bloomfield Barrens	BFB0514	pupae	1		Insecta				
Bloomfield Barrens	BFB0516	pupae	3		Insecta				
Bloomfield Barrens	BFB0516	insect exuvia	1		Insecta				
Bloomfield Barrens	BFB0520b	insect exuvia	1		Insecta				

Table C-4. Non crayfish burrow co-inhabitants continued.									
Site name	**Burrow name**	**Organism**	**Number**	**Scientific name**	**Class**	**Order**	**Family**	**Comment**	**Group totals**
Bloomfield Barrens	BFB0532	insect exuvia	1		Insecta				
Bean Blossum Bottom	BBB0503	insect exuvia	1		Insecta				
Bean Blossum Bottom	BBB0503	insect body parts	1		Insecta				
Bean Blossum Bottom	BBB0504	insect exuvia	3		Insecta				
Bean Blossum Bottom	BBB0504	insect body parts	1		Insecta				
Bean Blossum Bottom	BBB0505	insect exuvia	1		Insecta				
Bean Blossum Bottom	BBB0507	insect parts	3		Insecta				
Bean Blossum Bottom	BBB0507	insect exuvia	1		Insecta				
Bean Blossum Bottom	BBB0509	insect wing	1		Insecta				
Bean Blossum Bottom	BBB0511	insect exuvia	1		Insecta				
Bean Blossum Bottom	BBB0512	insect	2		Insecta				
Bean Blossum Bottom	BBB0514	insect exuvia	1		Insecta				
Bean Blossum Bottom	BBB0515	insect exuvia	1		Insecta				
Bean Blossum Bottom	BBB0517	pupae	1		Insecta				
Bean Blossum Bottom	BBB0526	insect body parts	1		Insecta				
Bean Blossum Bottom	BBB0529	insect pupae exuvia	1		Insecta				
Bean Blossum Bottom	BBB0538	insect larvae	1		Insecta				
Bean Blossum Bottom	BBB0538	pupae	1		Insecta				
Bean Blossum Bottom	BBB0544	insect egg	22		Insecta				
Bean Blossum Bottom	BBB0553	pupae	25		Insecta				
Potowatami Nature Preserve	PNP0601	pupae	4		Insecta				
Potowatami Nature Preserve	PNP0613	insect/mite	1		Insecta				
Potowatami Nature Preserve	PNP0614	pupae	2		Insecta				
Potowatami Nature Preserve	PNP0623	pupae	3		Insecta				
Potowatami Nature Preserve	PNP0632	unknown larvae	1		Insecta				
Summit Lake	SL0602	pupae	2		Insecta				
Summit Lake	SL0605	pupae	1		Insecta				
Summit Lake	SL0616	insect	1		Insecta				
Summit Lake	SL0617	insect wing	1		Insecta				
Summit Lake	SL0619	insect body parts	1		Insecta				
Summit Lake	SL0620	insect exuvia	2		Insecta				

Table C-4. Non crayfish burrow co-inhabitants continued.									
Site name	**Burrow name**	**Organism**	**Number**	**Scientific name**	**Class**	**Order**	**Family**	**Comment**	**Group totals**
Summit Lake	SL0620	pupae	2		Insecta				
Summit Lake	SL0621	pupae	1		Insecta				
Summit Lake	SL0622	pupae	1		Insecta				
Summit Lake	SL0623	leg	1		Insecta				
Summit Lake	SL0625	larvae	1		Insecta				
Summit Lake	SL0625	pupae	1		Insecta				
Summit Lake	SL0625	exuvia	4		Insecta				
Summit Lake	SL0627	pupae	1		Insecta				
Summit Lake	SL0627	insect exuvia	1		Insecta				
Summit Lake	SL0631	pupae	1		Insecta				
Summit Lake	SL0633	pupae	1		Insecta				
Summit Lake	SL0635	pupae	1		Insecta				
Fallin Timber	FT0613	pupae	1		Insecta				
Fallin Timber	FT0639	insect	1		Insecta				259
Hoosier Prairie	RFT-04-89-10	Lemnaea stagnalis	2		Molluska	Gastropoda	Lymnaeidae		
Hoosier Prairie	RFT-04-89-16	Limnaea stagnalis	1		Molluska	Gastropoda	Lymnaeidae		
Hoosier Prairie	RFT-04-89-6	Lemnae sp.	1		Molluska	Gastropoda	Lymnaeidae		4
Hoosier Prairie	RFT-04-45-11	Physa sp.	2		Molluska	Gastropoda	Physidae		
Hoosier Prairie	RFT-04-45-18	Physa sp.	1		Molluska	Gastropoda	Physidae		
Hoosier Prairie	RFT-04-45-2	Physa sp.	31		Molluska	Gastropoda	Physidae		
Hoosier Prairie	RFT-04-45-3	Physa sp.	5		Molluska	Gastropoda	Physidae		
Hoosier Prairie	RFT-04-45-9	Physa sp.	1		Molluska	Gastropoda	Physidae		
Twin Swamps	RFT-04-44-5	Physa sp.	2		Molluska	Gastropoda	Physidae		
Hoosier Prairie	RFT-04-89-18	Physa sp.	1		Molluska	Gastropoda	Physidae		
Hoosier Prairie	RFT-04-89-23	Physa sp.	4		Molluska	Gastropoda	Physidae		
Hoosier Prairie	HP200503	Physa sp.	1		Molluska	Gastropoda	Physidae		
Hoosier Prairie	HP200512	Physa sp.	3		Molluska	Gastropoda	Physidae		
Hoosier Prairie	HP200514	Physa sp.	4		Molluska	Gastropoda	Physidae		
Bean Blossum Bottom	BBB0517	physa	1		Molluska	Gastropoda	Physidae		
Fallin Timber	FT0612	Physa	2		Molluska	Gastropoda	Physidae		58
Hoosier Prairie	RFT-04-89-21	Helisoma sp.	1		Molluska	Gastropoda	Planorbidae		

Table C-4. Non crayfish burrow co-inhabitants continued.									
Site name	**Burrow name**	**Organism**	**Number**	**Scientific name**	**Class**	**Order**	**Family**	**Comment**	**Group totals**
Hoosier Prairie	RFT-04-89-6	Helisoma sp.	1		Molluska	Gastropoda	Planorbidae		
Hoosier Prairie	HP200503	Helisoma sp.	1		Molluska	Gastropoda	Planorbidae		
Hoosier Prairie	HP200512	Helisoma sp.	7		Molluska	Gastropoda	Planorbidae		
Hoosier Prairie	HP200513	Helisoma sp.	2		Molluska	Gastropoda	Planorbidae		
Hoosier Prairie	HP200514	Helisoma sp.	12		Molluska	Gastropoda	Planorbidae		
Bloomfield Barrens	BFB0501	Helisoma sp.	1		Molluska	Gastropoda	Planorbidae		25
Fallin Timber	FT0603	snail terrestrial helios	12		Molluska	Gastropoda	Planorbidae		
Fallin Timber	FT0604	snail terrestrial helios	4		Molluska	Gastropoda	Planorbidae		
Fallin Timber	FT0604	snail terrestrial helios	1		Molluska	Gastropoda	Planorbidae		
Fallin Timber	FT0611	snail terrestrial helios	1		Molluska	Gastropoda	Planorbidae		
Fallin Timber	FT0612	snail terrestrial helios	4		Molluska	Gastropoda	Planorbidae		
Fallin Timber	FT0624	snail terrestrial helios	1		Molluska	Gastropoda	Planorbidae		
Fallin Timber	FT0625	snail terrestrial helios	1		Molluska	Gastropoda	Planorbidae		
Fallin Timber	FT0626	snail terrestrial helios	2		Molluska	Gastropoda	Planorbidae		
Fallin Timber	FT0627	snail terrestrial helios	1		Molluska	Gastropoda	Planorbidae		
Fallin Timber	FT0632	snail terrestrial helios	1		Molluska	Gastropoda	Planorbidae		
Fallin Timber	FT0634	snail terrestrial helios	2		Molluska	Gastropoda	Planorbidae		
Fallin Timber	FT0641	snail terrestrial helios	1		Molluska	Gastropoda	Planorbidae		
Fallin Timber	FT0647	snail terrestrial helios	1		Molluska	Gastropoda	Planorbidae		32
Fallin Timber	FT0601	snail terrestrial pupilid	1		Molluska	Gastropoda	Pupillidae		
Fallin Timber	FT0603	snail terrestrial pupilid	4		Molluska	Gastropoda	Pupillidae		
Fallin Timber	FT0604	snail terrestrial pupilid	2		Molluska	Gastropoda	Pupillidae		
Fallin Timber	FT0607	snail terrestrial pupilid	3		Molluska	Gastropoda	Pupillidae		
Fallin Timber	FT0611	snail terrestrial pupilid	1		Molluska	Gastropoda	Pupillidae		
Fallin Timber	FT0616	snail terrestrial pupilid	1		Molluska	Gastropoda	Pupillidae		
Fallin Timber	FT0625	snail terrestrial pupilid	1		Molluska	Gastropoda	Pupillidae		
Fallin Timber	FT0626	snail terrestrial pupilid	1		Molluska	Gastropoda	Pupillidae		14
Turkey Run	RFT-04-88-14	snail fossil	1		Molluska	Gastropoda			
Turkey Run	RFT-04-88-19	snail	1		Molluska	Gastropoda			
Hoosier Prairie	RFT-04-45-11	snail ?	1		Molluska	Gastropoda			
Hoosier Prairie	RFT-04-89-13	snail	1		Molluska	Gastropoda			

Table C-4. Non crayfish burrow co-inhabitants continued.									
Site name	**Burrow name**	**Organism**	**Number**	**Scientific name**	**Class**	**Order**	**Family**	**Comment**	**Group totals**
Turkey Run	RFT-04-46-2	snail	1		Molluska	Gastropoda			
Turkey Run	RFT-04-46-9	land snail	2		Molluska	Gastropoda			
Hoosier Prairie	RFT-04-89-22	snail	3		Molluska	Gastropoda			
Hoosier Prairie	RFT-04-89-9	snail part	1		Molluska	Gastropoda			
Hoosier Prairie	RFT-04-89-9	snail	1		Molluska	Gastropoda			
Hoosier Prairie	HP200503	land snail	1		Molluska	Gastropoda			
Hoosier Prairie	HP200505	snail	1		Molluska	Gastropoda			
Hoosier Prairie	HP200513	snail	1		Molluska	Gastropoda			
Turkey Run	TR0507	snail	1		Molluska	Gastropoda			
Turkey Run	TR0510	land snail parts	1		Molluska	Gastropoda			
Bloomfield Barrens	BFB0508	snail	1		Molluska	Gastropoda			
Bloomfield Barrens	BFB0511	snail	1		Molluska	Gastropoda			
Bloomfield Barrens	BFB0512	snail	1		Molluska	Gastropoda			
Bloomfield Barrens	BFB0513	land snail	2		Molluska	Gastropoda			
Bloomfield Barrens	BFB0514	snail part	1		Molluska	Gastropoda			
Bean Blossum Bottom	BBB0539	snail	1		Molluska	Gastropoda			
Summit Lake	SL0622	land snail	4	helios	Molluska	Gastropoda			
Summit Lake	SL0625	snail	1		Molluska	Gastropoda			
Summit Lake	SL0625	snail	1		Molluska	Gastropoda			
Summit Lake	SL0628	snail terrestrial	2		Molluska	Gastropoda			
Fallin Timber	FT0602	snail terrestrial	2		Molluska	Gastropoda			
Fallin Timber	FT0603	snail terrestrial	6		Molluska	Gastropoda			
Fallin Timber	FT0604	snail parts	1		Molluska	Gastropoda			
Fallin Timber	FT0607	snail helios	1		Molluska	Gastropoda			
Fallin Timber	FT0608	snail terrestrial	6		Molluska	Gastropoda			
Fallin Timber	FT0609	snail terrestrial	3		Molluska	Gastropoda			
Fallin Timber	FT0612	snail terrestrial	3		Molluska	Gastropoda			
Fallin Timber	FT0635	snail	1		Molluska	Gastropoda			
Fallin Timber	FT0639	snail	1		Molluska	Gastropoda			33
Hoosier Prairie	RFT-04-89-24	egg	3		Molluska	Gastropoda?			
Hoosier Prairie	HP200501	egg	2		Molluska	Gastropoda?			

Table C-4. Non crayfish burrow co-inhabitants continued.									
Site name	**Burrow name**	**Organism**	**Number**	**Scientific name**	**Class**	**Order**	**Family**	**Comment**	**Group totals**
Hoosier Prairie	HP200503	egg	1		Molluska	Gastropoda?			
Hoosier Prairie	HP200505	egg	6		Molluska	Gastropoda?			
Twin Swamps	TS0513	egg	1		Molluska	Gastropoda?			
Turkey Run	TR0510	egg?	1		Molluska	Gastropoda?			
Bean Blossum Bottom	BBB0511	egg	3		Molluska	Gastropoda?			
Bean Blossum Bottom	BBB0516	egg	1		Molluska	Gastropoda?			
Bean Blossum Bottom	BBB0517	egg	8		Molluska	Gastropoda?			
Bean Blossum Bottom	BBB0518	egg	4		Molluska	Gastropoda?			
Bean Blossum Bottom	BBB0520	egg	1		Molluska	Gastropoda?			
Potowatami Nature Preserve	PNP0606	egg	1		Molluska	Gastropoda?			
Summit Lake	SL0604	egg	1		Molluska	Gastropoda?			
Summit Lake	SL0608	egg	1		Molluska	Gastropoda?			
Summit Lake	SL0620	egg mass	1		Molluska	Gastropoda?			
Summit Lake	SL0622	egg	14		Molluska	Gastropoda?			
Summit Lake	SL0622	egg	4		Molluska	Gastropoda?			
Summit Lake	SL0622	egg	4		Molluska	Gastropoda?			
Fallin Timber	FT0626	egg	2		Molluska	Gastropoda?			
Fallin Timber	FT0633	egg	1		Molluska	Gastropoda?			
Fallin Timber	FT0637	egg	1		Molluska	Gastropoda?			
Fallin Timber	FT0644	egg	2		Molluska	Gastropoda?			63
Hoosier Prairie	RFT-04-45-10	fingernail clam	11		Molluska	Pelecypoda	Sphæriidae		
Hoosier Prairie	RFT-04-45-11	fingernail clam	1		Molluska	Pelecypoda	Sphæriidae		
Hoosier Prairie	RFT-04-45-14	fingernail clam	2		Molluska	Pelecypoda	Sphæriidae		
Hoosier Prairie	RFT-04-45-16	fingernail clam	1		Molluska	Pelecypoda	Sphæriidae		
Hoosier Prairie	RFT-04-45-18	fingernail clam	1		Molluska	Pelecypoda	Sphæriidae		
Hoosier Prairie	RFT-04-45-3	fingernail clam	7		Molluska	Pelecypoda	Sphæriidae		
Hoosier Prairie	RFT-04-45-4	fingernail clam	3		Molluska	Pelecypoda	Sphæriidae		
Hoosier Prairie	RFT-04-45-5	fingernail clam	5		Molluska	Pelecypoda	Sphæriidae		
Hoosier Prairie	RFT-04-45-8	fingernail clam	3		Molluska	Pelecypoda	Sphæriidae		
Hoosier Prairie	RFT-04-89-10	fingernail clam	32		Molluska	Pelecypoda	Sphæriidae		
Hoosier Prairie	RFT-04-89-12	fingernail clam	1		Molluska	Pelecypoda	Sphæriidae		

Table C-4. Non crayfish burrow co-inhabitants continued.									
Site name	**Burrow name**	**Organism**	**Number**	**Scientific name**	**Class**	**Order**	**Family**	**Comment**	**Group totals**
Hoosier Prairie	RFT-04-89-14	fingernail clam	1		Molluska	Pelecypoda	Sphaeriidae		
Hoosier Prairie	RFT-04-89-15	fingernail clam	2		Molluska	Pelecypoda	Sphaeriidae		
Turkey Run	RFT-04-46-9	fingernail clam	1		Molluska	Pelecypoda	Sphaeriidae		
Hoosier Prairie	RFT-04-89-17	fingernail clam	8		Molluska	Pelecypoda	Sphaeriidae		
Hoosier Prairie	RFT-04-89-18	fingernail clam	5		Molluska	Pelecypoda	Sphaeriidae		
Hoosier Prairie	RFT-04-89-21	fingernail clam	2		Molluska	Pelecypoda	Sphaeriidae		
Hoosier Prairie	RFT-04-89-24	fingernail clam	15		Molluska	Pelecypoda	Sphaeriidae		
Hoosier Prairie	RFT-04-89-5	fingernail clam	16		Molluska	Pelecypoda	Sphaeriidae		
Hoosier Prairie	RFT-04-89-6	fingernail clam	5		Molluska	Pelecypoda	Sphaeriidae		
Hoosier Prairie	RFT-04-89-9	fingernail clam	19		Molluska	Pelecypoda	Sphaeriidae		
Hoosier Prairie	HP200501	fingernail clam	17		Molluska	Pelecypoda	Sphaeriidae		
Hoosier Prairie	HP200502	fingernail clam	3		Molluska	Pelecypoda	Sphaeriidae		
Hoosier Prairie	HP200503	fingernail clam	9		Molluska	Pelecypoda	Sphaeriidae		
Hoosier Prairie	HP200504	fingernail clam	1		Molluska	Pelecypoda	Sphaeriidae		
Hoosier Prairie	HP200506	fingernail clam	7		Molluska	Pelecypoda	Sphaeriidae		
Hoosier Prairie	HP200512	fingernail clam	9		Molluska	Pelecypoda	Sphaeriidae		
Hoosier Prairie	HP200512	fingernail clam	48		Molluska	Pelecypoda	Sphaeriidae		
Hoosier Prairie	HP200513	fingernail clam	3		Molluska	Pelecypoda	Sphaeriidae		
Hoosier Prairie	HP200514	fingernail clam	14		Molluska	Pelecypoda	Sphaeriidae		
Fallin Timber	FT0603	fingernail clam schell	3		Molluska	Pelecypoda	Sphaeriidae		
Fallin Timber	FT0603	fingernail clam part	4		Molluska	Pelecypoda	Sphaeriidae		
Fallin Timber	FT0603	fingernail clam	1		Molluska	Pelecypoda	Sphaeriidae		
Fallin Timber	FT0604	fingernail clam	2		Molluska	Pelecypoda	Sphaeriidae		
Fallin Timber	FT0604	fingernail clam schell	2		Molluska	Pelecypoda	Sphaeriidae		
Fallin Timber	FT0607	fingernail clam	2		Molluska	Pelecypoda	Sphaeriidae		
Fallin Timber	FT0607	fingernail clam schell	1		Molluska	Pelecypoda	Sphaeriidae		267/519
Turkey Run	RFT-04-88-3	nematode	1		Nematoda				
Turkey Run	RFT-04-88-4	nematode	1		Nematoda				
Turkey Run	RFT-04-88-5	nematode	2		Nematoda				
Hoosier Prairie	RFT-04-45-14	nematode	1		Nematoda				
Hoosier Prairie	RFT-04-45-9	nematode	1		Nematoda				

Table C-4. Non crayfish burrow co-inhabitants continued.									
Site name	**Burrow name**	**Organism**	**Number**	**Scientific name**	**Class**	**Order**	**Family**	**Comment**	**Group totals**
Twin Swamps	RFT-04-44-10	nematode	2		Nematoda				
Twin Swamps	RFT-04-44-13	nematode	1		Nematoda				
Twin Swamps	RFT-04-44-4	nematode	2		Nematoda				
Twin Swamps	RFT-04-44-5	nematode	2		Nematoda				
Twin Swamps	RFT-04-87-10	nematode	1		Nematoda				
Twin Swamps	RFT-04-87-12	nematode	2		Nematoda				
Turkey Run	RFT-04-46-1	nematode	3		Nematoda				
Turkey Run	RFT-04-46-10	nematode	1		Nematoda				
Turkey Run	RFT-04-46-11	nematode	1		Nematoda				
Turkey Run	RFT-04-46-5	nematode	6		Nematoda				
Turkey Run	RFT-04-46-8	nematode	2		Nematoda				
Turkey Run	RFT-04-46-9	nematode	1		Nematoda				
Hoosier Prairie	RFT-04-89-24	nematode	2		Nematoda				
Hoosier Prairie	HP200501	nematode	4		Nematoda				
Hoosier Prairie	HP200503	nematode	7		Nematoda				
Hoosier Prairie	HP200507	nematode	2		Nematoda				
Hoosier Prairie	HP200512	nematode	1		Nematoda				
Hoosier Prairie	HP200514	nematode	1		Nematoda				
Twin Swamps	TS0501	nematode	3		Nematoda				
Twin Swamps	TS0502	nematode	1		Nematoda				
Twin Swamps	TS0507	nematode	1		Nematoda				
Twin Swamps	TS0508	nematode	8		Nematoda				
Twin Swamps	TS0509	nematode	1		Nematoda				
Twin Swamps	TS0510	nematode	15		Nematoda				
Twin Swamps	TS0511	nematode	5		Nematoda				
Twin Swamps	TS0512	nematode	1		Nematoda				
Turkey Run	TR0501	nematode	2		Nematoda				
Turkey Run	TR0504	nematode	1		Nematoda				
Turkey Run	TR0505	nematode	1		Nematoda				
Turkey Run	TR0506	nematode	2		Nematoda				
Turkey Run	TR0506	nematode	58		Nematoda				

Table C-4. Non crayfish burrow co-inhabitants continued.									
Site name	**Burrow name**	**Organism**	**Number**	**Scientific name**	**Class**	**Order**	**Family**	**Comment**	**Group totals**
Turkey Run	TR0507	nematode	11		Nematoda				
Bloomfield Barrens	BFB0504	nematode	2		Nematoda				
Bloomfield Barrens	BFB0508	nematode	2		Nematoda				
Bloomfield Barrens	BFB0510	nematode	3		Nematoda				
Bloomfield Barrens	BFB0511	nematode	14		Nematoda				
Bloomfield Barrens	BFB0512	nematode	10		Nematoda				
Bloomfield Barrens	BFB0513	nematode	2		Nematoda				
Bloomfield Barrens	BFB0514	nematode	3		Nematoda				
Bloomfield Barrens	BFB0515	nematode	3		Nematoda				
Bloomfield Barrens	BFB0515b	nematode	1		Nematoda				
Bloomfield Barrens	BFB0521	nematode	2		Nematoda				
Bloomfield Barrens	BFB0519b	nematode	1		Nematoda				
Bloomfield Barrens	BFB0520b	nematode	1		Nematoda				
Bloomfield Barrens	BFB0527	nematode	2		Nematoda				
Bloomfield Barrens	BFB0531	nematode	7		Nematoda				
Bean Blossum Bottom	BBB0510	nematode	1		Nematoda				
Bean Blossum Bottom	BBB0511	nematode	1		Nematoda				
Bean Blossum Bottom	BBB0512	nematode	1		Nematoda				
Bean Blossum Bottom	BBB0513	nematode	2		Nematoda				
Bean Blossum Bottom	BBB0514	nematode	21		Nematoda				
Bean Blossum Bottom	BBB0516	nematode	3		Nematoda				
Bean Blossum Bottom	BBB0517	nematode	25		Nematoda				
Bean Blossum Bottom	BBB0520	nematode	3		Nematoda				
Bean Blossum Bottom	BBB0523	nematode	1		Nematoda				
Bean Blossum Bottom	BBB0524	nematode	4		Nematoda				
Bean Blossum Bottom	BBB0526	nematode	1		Nematoda				
Bean Blossum Bottom	BBB0529	nematode	1		Nematoda				
Bean Blossum Bottom	BBB0543	nematode	2		Nematoda				
Bean Blossum Bottom	BBB0544	nematode	1		Nematoda				
Bean Blossum Bottom	BBB0547	nematode	3		Nematoda				
Bean Blossum Bottom	BBB0551	nematode	1		Nematoda				

Table C-4. Non crayfish burrow co-inhabitants continued.									
Site name	**Burrow name**	**Organism**	**Number**	**Scientific name**	**Class**	**Order**	**Family**	**Comment**	**Group totals**
Bean Blossum Bottom	BBB0555	nematode	3		Nematoda				
Bean Blossum Bottom	BBB0556	nematode	26		Nematoda				
Bean Blossum Bottom	BBB0556	nematode	19		Nematoda				
Bean Blossum Bottom	BBB0557	nematode	2		Nematoda				
Bean Blossum Bottom	BBB0558	nematode	3		Nematoda				
Potowatami Nature Preserve	PNP0601	nematode	3		Nematoda				
Potowatami Nature Preserve	PNP0602	nematode	5		Nematoda				
Potowatami Nature Preserve	PNP0603	nematode	3		Nematoda				
Potowatami Nature Preserve	PNP0605	nematode	1		Nematoda				
Potowatami Nature Preserve	PNP0606	nematode	1		Nematoda				
Potowatami Nature Preserve	PNP0608	nematode	2		Nematoda				
Potowatami Nature Preserve	PNP0610	nematode	3		Nematoda				
Potowatami Nature Preserve	PNP0611	nematode	6		Nematoda				
Potowatami Nature Preserve	PNP0612	nematode	11		Nematoda				
Potowatami Nature Preserve	PNP0613	nematode	2		Nematoda				
Potowatami Nature Preserve	PNP0614	nematode	1		Nematoda				
Potowatami Nature Preserve	PNP0616	nematode	3		Nematoda				
Potowatami Nature Preserve	PNP0620	nematode	1		Nematoda				
Potowatami Nature Preserve	PNP0621	nematode	2		Nematoda				
Potowatami Nature Preserve	PNP0622	nematode	2	roundworm	Nematoda				
Potowatami Nature Preserve	PNP0624	nematode	3		Nematoda				
Potowatami Nature Preserve	PNP0625	nematode	1		Nematoda				
Potowatami Nature Preserve	PNP0626	nematode	3		Nematoda				
Potowatami Nature Preserve	PNP0630	nematode	2		Nematoda				
Potowatami Nature Preserve	PNP0633	nematode	4	roundworm	Nematoda				
Potowatami Nature Preserve	PNP0634	nematode	6		Nematoda				
Potowatami Nature Preserve	PNP0635	nematode	3		Nematoda				
Potowatami Nature Preserve	PNP0638	nematode	2		Nematoda				
Summit Lake	SL0601	nematode	3		Nematoda				
Summit Lake	SL0601	nematode	5	roundworm	Nematoda				
Summit Lake	SL0602	nematode	12		Nematoda				

Table C-4. Non crayfish burrow co-inhabitants continued.									
Site name	**Burrow name**	**Organism**	**Number**	**Scientific name**	**Class**	**Order**	**Family**	**Comment**	**Group totals**
Summit Lake	SL0602	nematode	13	roundworm	Nematoda				
Summit Lake	SL0603	nematode	3		Nematoda				
Summit Lake	SL0603	nematode	2	roundworm	Nematoda				
Summit Lake	SL0604	nematode	2	roundworm	Nematoda				
Summit Lake	SL0604	nematode	2		Nematoda				
Summit Lake	SL0605	nematode	3		Nematoda				
Summit Lake	SL0605	nematode	1	roundworm	Nematoda				
Summit Lake	SL0606	nematode	5	roundworm	Nematoda				
Summit Lake	SL0607	nematode	3		Nematoda				
Summit Lake	SL0607	nematode	1	roundworm	Nematoda				
Summit Lake	SL0608	nematode	1		Nematoda				
Summit Lake	SL0609	nematode	3	roundworm	Nematoda				
Summit Lake	SL0609	nematode	2		Nematoda				
Summit Lake	SL0610	nematode	2		Nematoda				
Summit Lake	SL0611	nematode	2		Nematoda				
Summit Lake	SL0611	nematode	1	roundworm	Nematoda				
Summit Lake	SL0612	nematode	2		Nematoda				
Summit Lake	SL0612	nematode	1	roundworm	Nematoda				
Summit Lake	SL0613	nematode	5	roundworm	Nematoda				
Summit Lake	SL0613	nematode	1		Nematoda				
Summit Lake	SL0616	nematode	1	roundworm	Nematoda				
Summit Lake	SL0616	nematode	1		Nematoda				
Summit Lake	SL0617	nematode	4		Nematoda				
Summit Lake	SL0618	nematode	5		Nematoda				
Summit Lake	SL0619	nematode	3		Nematoda				
Summit Lake	SL0621	nematode	2	roundworm	Nematoda				
Summit Lake	SL0621	nematode	1		Nematoda				
Summit Lake	SL0622	nematode	1	roundworm	Nematoda				
Summit Lake	SL0622	nematode	3		Nematoda				
Summit Lake	SL0623	nematode	3	roundworm	Nematoda				
Summit Lake	SL0623	nematode	2		Nematoda				

Table C-4. Non crayfish burrow co-inhabitants continued.									
Site name	**Burrow name**	**Organism**	**Number**	**Scientific name**	**Class**	**Order**	**Family**	**Comment**	**Group totals**
Summit Lake	SL0627	nematode	2	roundworm	Nematoda				
Summit Lake	SL0628	nematode	13		Nematoda				
Summit Lake	SL0629	nematode	4		Nematoda				
Summit Lake	SL0631	nematode	1		Nematoda				
Summit Lake	SL0633	nematode	1		Nematoda				
Summit Lake	SL0634	nematode	1		Nematoda				
Summit Lake	SL0635	nematode	13		Nematoda				
Summit Lake	SL0636	nematode	3		Nematoda				
Summit Lake	SL0636	nematode	1	roundworm	Nematoda				
Summit Lake	SL0637	nematode	2		Nematoda				
Summit Lake	SL0638	nematode	2	roundworm	Nematoda				
Summit Lake	SL0639	nematode	1		Nematoda				
Fallin Timber	FT0601	nematode	1	roundworm	Nematoda				
Fallin Timber	FT0602	nematode	1		Nematoda				
Fallin Timber	FT0604	nematode	5		Nematoda				
Fallin Timber	FT0606	nematode	1	roundworm	Nematoda				
Fallin Timber	FT0607	nematode	7		Nematoda				
Fallin Timber	FT0607	nematode	2	roundworm	Nematoda				
Fallin Timber	FT0608	nematode	9		Nematoda				
Fallin Timber	FT0611	nematode	2		Nematoda				
Fallin Timber	FT0616	nematode	1		Nematoda				
Fallin Timber	FT0621	nematode	1		Nematoda				
Fallin Timber	FT0625	nematode	1		Nematoda				
Fallin Timber	FT0630	nematode	2		Nematoda				
Fallin Timber	FT0631	nematode	9		Nematoda				
Fallin Timber	FT0637	nematode	1		Nematoda				592
Hoosier Prairie	RFT-04-45-12	No organisms	0		No organisms				
Hoosier Prairie	RFT-04-45-13	No organisms	0		No organisms				
Twin Swamps	RFT-04-87-4	No organisms	0		No organisms				
Twin Swamps	RFT-04-87-7	No organisms	0		No organisms				
Bloomfield Barrens	BFB0514b	No organisms	0		No organisms				

Table C-4. Non crayfish burrow co-inhabitants continued.									
Site name	**Burrow name**	**Organism**	**Number**	**Scientific name**	**Class**	**Order**	**Family**	**Comment**	**Group totals**
Bloomfield Barrens	BFB0519	No organisms	0		No organisms				
Bloomfield Barrens	BFB0520	No organisms	0		No organisms				
Bloomfield Barrens	BFB0522	No organisms	0		No organisms				
Bean Blossum Bottom	BBB0508	No organisms	0		No organisms				
Bean Blossum Bottom	BBB0527	No organisms	0		No organisms				
Potowatami Nature Preserve	PNP0617	No organisms	0		No organisms				
Potowatami Nature Preserve	PNP0618	No organisms	0		No organisms				
Potowatami Nature Preserve	PNP0627	No organisms	0		No organisms				
Potowatami Nature Preserve	PNP0628	No organisms	0		No organisms				
Potowatami Nature Preserve	PNP0636	No organisms	0		No organisms				
Summit Lake	SL0624	No organisms	0		No organisms				
Fallin Timber	FT0605	No organisms	0		No organisms				
Fallin Timber	FT0619	No organisms	0		No organisms				
Fallin Timber	FT0628	No organisms	0		No organisms				
Potowatami Nature Preserve	PNP0608	fish scale	1		Osteichthyes				
Potowatami Nature Preserve	PNP0630	blastula	1		unknown				
Potowatami Nature Preserve	PNP0632	blastula	1		unknown				
Summit Lake	SL0608	blastula	1		unknown				
Summit Lake	SL0609	blastula	2		unknown				
Turkey Run	RFT-04-88-10	No collection	0						
Turkey Run	RFT-04-88-11	No collection	0						
Turkey Run	RFT-04-88-12	No collection	0						
Turkey Run	RFT-04-88-18	No collection	0						
Turkey Run	RFT-04-88-2	No collection	0						
Turkey Run	RFT-04-88-4	??	1						
Turkey Run	RFT-04-88-6	??	1						
Turkey Run	RFT-04-88-7	No collection	0						
Turkey Run	RFT-04-88-8	No collection	0						
Turkey Run	RFT-04-88-9	No collection	0						
Hoosier Prairie	RFT-04-45-14	??	1						
Hoosier Prairie	RFT-04-45-15	No collection	0						

Table C-4. Non crayfish burrow co-inhabitants continued.									
Site name	**Burrow name**	**Organism**	**Number**	**Scientific name**	**Class**	**Order**	**Family**	**Comment**	**Group totals**
Hoosier Prairie	RFT-04-45-17	No collection	0						
Hoosier Prairie	RFT-04-45-19	No collection	0						
Hoosier Prairie	RFT-04-45-20	??	1						
Hoosier Prairie	RFT-04-45-3	??	2						
Hoosier Prairie	RFT-04-45-5	??	3						
Hoosier Prairie	RFT-04-45-6	No collection	0						
Hoosier Prairie	RFT-04-45-7	No collection	0						
Hoosier Prairie	RFT-04-89-1	No collection	0						
Twin Swamps	RFT-04-44-12	No collection	0						
Twin Swamps	RFT-04-44-4	??	1						
Twin Swamps	RFT-04-87-14	??	1						
Twin Swamps	RFT-04-87-6	No collection	0						
Turkey Run	RFT-04-46-5	??	1						
Turkey Run	RFT-04-46-7	No collection	0						
Turkey Run	RFT-04-88-1	No collection	0						
Hoosier Prairie	RFT-04-89-19	No collection	0						
Hoosier Prairie	RFT-04-89-2	No collection	0						
Hoosier Prairie	RFT-04-89-20	No collection	0						
Hoosier Prairie	RFT-04-89-24	??	3						
Hoosier Prairie	RFT-04-89-3	No collection	0						
Hoosier Prairie	RFT-04-89-4	No collection	0						
Hoosier Prairie	RFT-04-89-8	No collection	0						
Twin Swamps	TS0509	unknown	1						
Twin Swamps	TS0511	??	1						
Bloomfield Barrens	BFB0528	unknown	1						
Bean Blossum Bottom	BBB0506	unknown	2						
Bean Blossum Bottom	BBB0518	unknown	9						
Potowatami Nature Preserve	PNP0605	unknown	1						
Potowatami Nature Preserve	PNP0623	unknown	1						
Potowatami Nature Preserve	PNP0629	unknown	1						
Summit Lake	SL0613	unknown	1						

Table C-4. Non crayfish burrow co-inhabitants continued.									
Site name	**Burrow name**	**Organism**	**Number**	**Scientific name**	**Class**	**Order**	**Family**	**Comment**	**Group totals**
Summit Lake	SL0631	unknown	1						
Fallin Timber	FT0603	vertebrae psuedo-fossil	1						
Fallin Timber	FT0604	unknown	1						
Fallin Timber	FT0607	unknown	1						
Fallin Timber	FT0637	unknown	1						
		Total organisms =	38635						