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RESEARCH ARTICLE

NOTES ON THE DISTRIBUTION OF *PLETHODON GLUTINOSUS* (GREEN, 1818) IN MARYLAND

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ABSTRACT

The distribution of the slimy salamander, *Plethodon glutinosus* (Green, 1818), is mapped for the state of Maryland. Errors in the literature are corrected and overlooked references are noted. Emphasis is placed on the Piedmont where the species has a perplexing distribution, with vast unoccupied areas, yet occurs to a very limited extent on the Coastal Plain. A first valid report from the Great Valley is cited. Comparisons in relative abundance are made between *Plethodon cinereus* (Green, 1818) and *P. glutinosus* in the Piedmont and transitional areas.

Keywords: Coastal Plain, Great Valley, Piedmont, *Plethodon cinereus*, slimy salamander.

INTRODUCTION

Dunn (1926), in his monograph on the Plethodontidae, was the first author to map the distribution of the slimy salamander, *Plethodon glutinosus* (Green, 1818), throughout its range. He plotted one site from Maryland (Jennings, Garrett County) based on one specimen in the Academy of Natural Sciences of Philadelphia as it was then known. Grobman (1944), restricting his work to the *Plethodon* of the eastern United States and Canada, was the next author to map this species' distribution. He plotted seven sites in the state and due to the numerous localities mapped only specimens of special interest were cited and discussed.

Marsiglia (1950), in an article rife with errors, was the next author to map the slimy salamander's distribution in Maryland. Although the title of his note stated "county records," only one such record was cited: Loch Raven, Baltimore County. He asserted that Loch Raven was "about two miles [3.2 km] above the Fall Line in a northwesterly direction," then mapped it on his

notion of where the Fall Line is located in the county. In reality, Loch Raven, as the term is understood by herpers, is roughly 8.0 miles (13 km) above (NW) of the Fall Line. Marsiglia also stated that Loch Raven is in “upper Baltimore County,” when in reality it lies in the south-central part of the county. Further, he claimed “Baltimore County is located almost entirely in the Piedmont Plateau region.” I estimate that about 20% of the county lies on the Coastal Plain. Marsiglia then proceeded to list 58 specimens that he claimed were present in the NHSM. I did not maintain a comprehensive list of discarded amphibians in the NHSM collection as I did for reptiles (Miller, 2015a) so Marsiglia may be correct on some points. However, the following should be noted. No catalogue numbers were cited and dates were listed only by year. Frederick County: Marsiglia cited 29 specimens from five localities. Only nine specimens from three localities exist today. Pen Mar (now Pen Mar Park) is in Washington County, not Frederick County. Garrett County: Ten specimens from two localities were listed; only one is extant. Harford County: Of 19 specimens listed from two hopelessly vague sites (Broad Creek and Deer Creek) none exist today. Overlooked was 1.0 mile (1.6 km) W Conowingo Dam (NHSM 1059, 11 July 1946). Concerning Marsiglia’s map, his lone site in Allegany County was not even close to Keller’s (1945) locality. Overlooked was a site provided by Fowler (1944), nor was Fowler cited. At least two of Marsiglia’s four sites in Frederick County were misplotted. I did not assess his nine mapped localities in Garrett County. Continuing, Marsiglia cited USNM “66843” from Glen Echo Heights, Montgomery County; the correct number is USNM 66483. “Potomac State Park” (USNM 102021) should read: Potomac State Forest at CCC (Civilian Conservation Corps) S51; “Swamp Run near Savage River” (USNM 101959-101960) should read: Pine Swamp Run near Savage River, and USNM 101959 is *Desmognathus fuscus* (Rafinesque, 1820), not *P. glutinosus*. “Bear Creek” (USNM 102058) should read Bear Creek near US Route 219. Of seven publications cited in the text, two (Fowler, “1943” 1945) and Keller (1945) were not listed in the references. Not cited by Marsiglia were the following: Fowler & Dunn (1917), Fowler (1925), Dunn (1926), McCauley & East (1940) and Grobman (1944).

Highton (1971), based on extensive field work, mapped numerous localities in Maryland. Sixteen sites were in the Piedmont. Due to the extreme number of localities Highton and his assistants collected, there was little documentation in his publication. Other distributional works considering the slimy salamander were by Cooper (1960, 1965) and Harris (1969, 1975). The former author, through matrices, recorded the herpetofauna of Maryland and the District of Columbia by political jurisdiction, and the latter author, for the most part, merely copied the working maps of Highton for the three species of *Plethodon* then known to occur in the state (H. S. Harris, Jr., personal communication, ca. 1980). Cunningham & Nazdrowicz (2018) were the most recent authors to map the distribution of *P. glutinosus* in Maryland; three of their reports are of concern here. Of sites plotted on iNaturalist, three were considered to be noteworthy.

Plethodon glutinosus occurs in ten of Maryland’s 23 counties and is confined to the mountains and portions of the Piedmont with slight encroachment onto the Coastal Plain. However, there are erroneous reports from Anne Arundel County and the District of Columbia. This article is concerned primarily with discussing the species’ perplexing distribution in the Piedmont; the species’ distribution throughout the state is also mapped (Fig. 1). Specimens from nine localities in western Washington County in the National Museum catalogued as *P. cylindraceus* (Harlan, 1825) x *glutinosus* are given no special consideration and are mapped as *P. glutinosus*. The sole record (USNM 554118) for *P. cylindraceus* in Maryland (Allegany County: NW Paw Paw: Malcolm Road, 9 June 2001) is marked on the map by a broken circle.

Specimens cited are in the following collections: Academy of Natural Sciences of Drexel University (ANSP), American Museum of Natural History (AMNH), Biodiversity Institute and Natural History Museum, University of Kansas (KU), Carnegie Museum of Natural History (CM), Florida Museum of Natural History, University of Florida (UF), Museum of Southwestern Biology, University of New Mexico (MSB), Natural History Museum of Los Angeles County (LACM), Natural History Society of Maryland (NHSM), Natural History Society of Maryland/Herbert S. Harris, Jr. (NHSM/HSH), National Museum of Natural History (USNM) and Towson University (TSU). The abbreviation MARA (Maryland Amphibian and Reptile Atlas = Cunningham & Nazdrowicz, 2018) is also used.

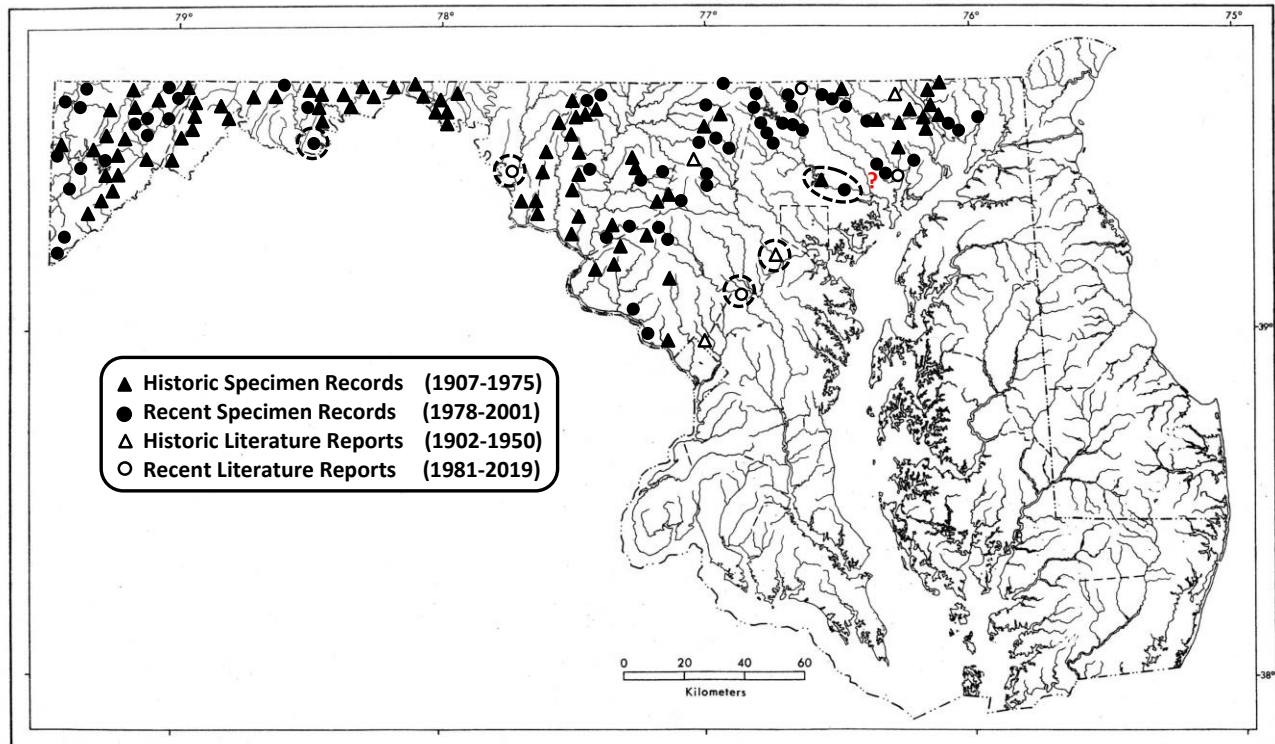


Figure 1. Map of Maryland, Delaware and the District of Columbia showing locality records and reports for the slimy salamander, *Plethodon glutinosus*, in Maryland. Dashed areas show isolated Piedmont sites, one Great Valley locality, and the sole record for *P. cylindraceus*.

DISCUSSION

Anne Arundel County: Touré & Middendorf (2002) recorded *Plethodon glutinosus* from the Sands Road Wetland Sanctuary (now Wootton’s Landing Park), the first report for the county and the first from a locality deep into the Coastal Plain of Maryland. Although the authors stated: “Voucher specimens for each species were collected for each site” and deposited in the National Museum, there is no indication of this for *P. glutinosus* and eight other species they reported. Apparently, *P. glutinosus* was mistaken for *Plethodon cinereus* (Green, 1818), a common species throughout nearly all of Maryland (Highton, 1971), although this species was neither listed nor vouchered by Touré & Middendorf either. In their Introduction, the authors stated: “Previous regional herpetofaunal surveys for Maryland and the District of Columbia region provide ample historic documentation of amphibian and reptile distribution within the DC metro region ...” They

cited 11 publications supporting their claim, six of which are mystifying: the very poor Kelly et al. (1936; see McCauley, 1945; Cooper, 1966; Miller, 2015b; Davis, 2018), mimeographed amphibian and reptile keys prepared in 1949 by, respectively, Romeo J. Mansueti and Robert H. McCauley, Jr., which although archived in the Division of Amphibians and Reptiles, National Museum, would not even qualify as gray literature. Inexplicably, they also cited a picture of a *Rana clamitans* (Latreille in Sonnini & Latreille, 1801) tadpole and a headshot of an adult *Chelydra serpentina* (Linnaeus, 1758) that appeared on the covers of separate issues of Maryland Naturalist published in 1953. It is also not clear how Harris (1966b) and Conant & Collins (1998) merit inclusion. These references do not “provide ample historic documentation of amphibian and reptile distribution within the DC metro region.” Although Hay (1902) could be cited as the first attempt to deal with a small portion of the Maryland herpetofauna, serious interest in the herpetology of Maryland cannot be said to have begun before McClellan et al. (1943) and especially McCauley (1945), published 59 and 57 years respectively before the publication of Touré & Middendorf’s survey. This survey was not cited in MARA.

Baltimore County: Four distributional irregularities occur in this county; one, along the Patapsco River, is more fittingly discussed under Howard County. Distribution along the Gunpowder Falls, the major stream in the county, is broken into two segments. A number of records exist for its northernmost reaches, but there are currently none for ca. 27 km downstream until the somewhat vague locality of Loch Raven (NHSM 1938, 11 April 1948) is reached. One site farther downstream (TSU 4122-4123, 29 April 1981; USNM 144308, 14 May 1961) has specific data. This area is encompassed on the map by a broken oval. A third anomalous area is the Little Gunpowder Falls, which forms much of the border between Baltimore and Harford Counties. There are currently no records along this stream, which runs for ca. 40 km until its confluence with the Gunpowder Falls. An analogy exists with *Eurycea longicauda* (Green, 1818), for which there are also no records along this stream. [A Reported (undocumented) site straddling the Little Gunpowder Falls was mapped in Cunningham & Nazdrowicz (2018). None of the three MARA project contacts for Harford County, nor the two contacts for Baltimore County were able to explain this site.] Both of these species have distributional irregularities in the Maryland Piedmont that are not shared with their smaller, ubiquitous congeners, *P. cinereus* and *Eurycea bislineata* (Green, 1818). Currently there is a vast area in central and southwestern Baltimore County where slimy salamanders have not been found and apparently do not occur. Miller (2015a) erred in stating that Mansueti’s (1941) “Gunpowder Falls near Harford Road” locality was not vouchered until I reported the TSU specimens mentioned above. One discarded specimen from 2.85 km E Maryland Line (TSU 4171, 12 May 1981) is treated as a literature report. I made 494 trips in Baltimore County (1974–2023) and collected *P. glutinosus* at 16 sites.

Carroll County: The distribution of slimy salamanders in this Piedmont county appears to be uniform, although the entire northwestern quarter of the county is without records. Harris (1969, 1975) mapped a site NW Taneytown in this area, but there is no documentation. However, this is probably due to insufficient field work and deforestation, which spills over into the Piedmont of Frederick County. Records are also lacking in the extreme southeast and along the county’s southern border, South Branch Patapsco River. One historic site is mapped from this county. This is based on discarded specimens formerly in the collection of Ralph F. Daffin: 2.0 miles (3.2 km) S Warfieldsburg (RFD 1499, 27 April 1957) and 4.0 miles (6.4 km) N Taylorsville (RFD 1821-1823, 29 June 1957). These two sites appear to be the same and are taken from Daffin’s jar labels.

There are discrepancies with Reed's (1957) listing for the former locality and it appears that he used the data for a specimen in the collection of Donald W. Linzey (DWL 993) collected on the same date. I made 68 trips (1979–2004) into this county and collected the species at 12 localities.

Cecil County: About one-third of this county lies in the Piedmont and the rest on the Coastal Plain. In 67 trips in this county (1984–2012), I found the species at only two sites. However, this would not have occurred were it not for discarded plywood at both localities. This cover seemed to retain the moisture necessary for the species to be present at the surface. One site (SE Theodore: Goosemar Road, TSU 6427-6428, 11 May 1984) consisted of poor woodland where I would not expect any salamander to occur, while the other (NE Perryville: Mill Creek, TSU 7447-7450, 9 May 1985) consisted of healthy woodland. As such, the species probably occurs to the east of the localities mapped herein. Another analogy with *E. longicauda* exists for this county for which there are currently no records for the eastern portion of the county (personal observations). White & White (2007) stated: “Found only in the Susquehanna River drainage of Cecil County, Maryland, where it [*P. glutinosus*] appears to be uncommon.” If the Whites had shown an interest in systematic collections instead of assuming Harris (1975) was definitive they would have learned about the two localities just cited. The Whites made inaccurate statements about the distributions of at least seven other species in Cecil County, but corrections of these are not appropriate here.

District of Columbia: Cope (1889) reported a specimen from this jurisdiction (USNM 13315, no date), but Addison H. Wynn informed me (personal communication, 2024) that an emendation to the National Museum's catalogue records the specimen from an unspecified locality in Fairfax County, Virginia. Hay (1902) and Cooper (1965) did not mention this specimen, nor was it mapped by Harris (1975).

Frederick County: About three-quarters of this county lie in the Piedmont with the remainder in the Blue Ridge. Slimy salamanders have been collected frequently in the Blue Ridge (USNM) and surprisingly often in the heavily denuded Piedmont (TSU, USNM). Distribution is thus uniform in suitable habitat and there is only one error to note. Inexplicably, Prince (1957), while commending Cunningham Falls as a habitat for *P. glutinosus*, stated that it “is situated within a region of gently sloping hills in the Western Division of the Maryland Piedmont,” when in fact it lies unquestionably within the Blue Ridge. Cunningham (2018) cited Prince but did not catch his error. I made 28 trips in this county from 1976–2007, collecting the species at four sites.

Harford County: The distribution of slimy salamanders in this largely Piedmont county is probably uniform within the Piedmont, but there are a few oddities to note. The absence of records along the Little Gunpowder Falls was mentioned under Baltimore County. A parallel but shorter stream confined to Harford County is Winters Run, where records are not currently known for most of its length. Two specimens from along this stream (TSU 6374-6375, 4 May 1984), like those from Cecil County, were found under man-made cover, in this case discarded roofing material adjacent a springhouse. Two sites lie in or adjacent the Coastal Plain. One was from an abandoned sand-gravel pit near Bush where one specimen (TSU 7435, 6 May 1985) was found in a small depression where a number of wet sticks and branches were present. The other was from a tiny woodlot bordered by Interstate Route 95, MD Route 24, and the ramp connecting the two roads. This was not a site where one would expect any herpetofauna to occur, but *P. glutinosus* (TSU 7460, 16 May 1985), *P. cinereus* (TSU 7457-7459) and *Diadophis punctatus* (Linnaeus,

1766) (TSU 7461) were collected here. At the time, the area was bordered by an extensive oldfield (since developed) and the nearest potential habitat (along Winters Run) was 960 m away. This locality is probably dubious and has been mapped with a question mark. A site mapped on the Coastal Plain in MARA is from the Anita C. Leight Estuary Center. The species was observed by Donald T. McKnight and MARA volunteers during 40 trips in 2011. (L. M. Davidson, personal communication, 2024). McKnight (personal communication, 2024) confirmed that *P. glutinosus* occurs at the Leight Center but was not able to provide a specific date or dates. Literature reports were published by Reed (1956, 1957) and Prince et al. (1957). Reed's (1956) "Broad Creek" site (no date, no collection nos.) was presumably the same as Prince et al.'s. Three other localities published by Reed have been subsumed by extant specimens.

Howard County: Cunningham (2018) committed numerous errors and omissions in her account of this species, and most are grouped here. First, she claimed there were 13 species in the *Plethodon glutinosus* complex, when Highton originally reported 16 (Highton et al., 1989, whom she cited). She was also unaware that several authors have questioned or not accepted Highton's taxonomy (Frost & Hillis, 1990; Petranka, 1998; Dodd, 2004). The last two publications were cited in Cunningham & Nazdrowicz (2018). She then cited Fowler (1944), Marsiglia (1950) and Harris (1975) as authorities on distribution in Maryland, but by far the most important one, Highton (1971), was not mentioned, although it was listed in MARA's references. Fowler listed only one locality. Marsiglia made numerous errors, which were noted in the Introduction. As was also noted in the Introduction, for the most part Harris merely copied Highton's maps. Being unfamiliar with the herp culture in Maryland, Cunningham could not have been expected to know this.

Cunningham's citation of Harris (1975) as an authority on reproduction in Maryland was mystifying. Harris was not knowledgeable about this subject and his statement that "Eggs are probably deposited in late May or early June" was unsourced and presumably inferred from Highton (1962) or taken from Lee (1973) who formed his graph from Highton (1962).

Cunningham also stated: "They [*P. glutinosus*] are active at the surface most of the year but do not normally stray far from their burrows, to which they exhibit site fidelity (Petranka, 1998)." Petranka actually wrote: "*In general, slimy salamanders tend to be active on the ground surface throughout the year except during droughts and during periods of extreme heat or cold [emphasis added].*" He said nothing about site fidelity in Maryland, nor did he use the word "burrows" anywhere in his account. In addition, Petranka, based on Highton (1956), stated: "In Florida individuals are very sedentary and are rarely recaptured more than 60 cm from their original sites of capture ..." This, of course, may have no bearing on the species' habits in Maryland. More germane, Highton (1962), referring to Maryland and Pennsylvania stated: "During the winter months this species retreats from its usual habitat under rotting logs, stone and other forest litter, becoming difficult to obtain. It is not often found at the surface during winter, even during warm periods when other salamanders are active." Highton (1956, 1962) were additional papers cited by Cunningham. In addition, Highton (1971), in Table 1, provided a month-by-month comparison over a 15-year period between *P. cinereus* and *P. glutinosus* at Cunningham Falls, Frederick County, showing how inactive the latter species was at the surface during cold weather. Cunningham, in her closing remarks, cited a paper reporting a decline in *P. glutinosus* in the Great Smoky Mountains National Park, Tennessee, yet in another overlooked paper she neglected to cite Highton (2005). Based on his and his assistants' field work, he reported declines of *P. glutinosus* in 26 out of 30 sites in 13 states in the 1990s vs. the pre-1990s. One of these localities was Cunningham Falls State Park. Highton's paper appeared in Lannoo (2005). This

book was cited at least once (Pauley & Watson, 2005) in Cunningham & Nazdrowicz (2018). Another interesting comment in Highton (2005) was the ratio of *P. cinereus* to *P. glutinosus* collected in this park from 1956–1976 (5.3 to 1). In roughly 800 trips in the Maryland Piedmont [earliest date 26 January (1976); latest date 5 December (1982)], I collected the species at 47 localities (46 discrete), including four sites on or transitional with the Coastal Plain. The earliest was 10 April (1981) and the latest was 17 October (1979). Table 1 shows the ratios of *P. glutinosus* vs. *P. cinereus* at sites I collected in the Maryland Piedmont and immediately adjacent areas from 1978–2010. Table 2 shows the number of specimens collected and their ratios for each species in this area.

Table 1. Comparison of collection sites (1978–2010) by the author of *Plethodon cinereus* and *P. glutinosus* in the Maryland Piedmont and transitional areas.

Month	<i>Plethodon cinereus</i>	<i>Plethodon glutinosus</i>	Ratio
January	–	–	–
February	–	–	–
March	17	0	0
April	91	11	0.12
May	54	30	0.56
June	10	0	0
July	1	0	0
August	–	–	–
September	17	4	0.24
October	15	2	0.13
November	–	–	–
December	–	–	–
Totals	205	47	0.23

Cunningham claimed that Cunningham & Nazdrowicz (2018) were the first to reliably document this species in Howard County. Actually, it was Miller (1984) who first vouchered the species in this county, near and at Mullinix (TSU 5421, 2 May 1983; TSU 5477, 4 May 1983). Miller (1984) was cited in Cunningham & Nazdrowicz (2018). A specimen that predates those reported by Miller, formerly in Richard Highton’s collection, is from 2.25 miles (3.6 km) SSW Florence and is now in the National Museum (USNM 375505, 6 April 1963). However, it was not catalogued until sometime in the late 1980s or early 1990s (A. H. Wynn, personal communication, 2024). There is also Cunningham’s terse dismissal of a site mapped in Harris (1975), which she called “a single unsubstantiated report.” This was for Avalon, Patapsco State Park (now Patapsco Valley State Park) based on three lost specimens collected in July 1950 by Howard W. Campbell (1935–1981). This was first reported by Harris (1966a) and was later mapped by him (1969, 1975) and listed in his species/county matrix. Miller (1984) also mentioned Campbell’s report. Miller (2015a) provided additional support for the presence of *P. glutinosus* in the lower Patapsco State Park that was unknown to Harris. Harris (1966a) and Miller (2015a) were additional references cited in MARA that Cunningham did not consult. It should also be noted that Campbell was a distinguished biologist (Lovich et al., 2012) and had two collections of papers dedicated to him shortly after his death (Dickinson, 1982; Scott, 1982). Hence Campbell’s report from Patapsco State Park is reliable and has been mapped herein.

Table 2. Comparison of numbers of specimens collected (1978–2010) by the author of *Plethodon cinereus* and *P. glutinosus* in the Maryland Piedmont and transitional areas.

Month	<i>Plethodon cinereus</i>	<i>Plethodon glutinosus</i>	Ratio
January	–	–	–
February	–	–	–
March	67	0	0
April	387	20	0.05
May	211	55	0.26
June	31	0	0
July	1	0	0
August	–	–	–
September	52	7	0.13
October	74	5	0.07
November	–	–	–
December	–	–	–
Totals	823	87	0.11

There are two postings on iNaturalist for *P. glutinosus* in Howard County. The first was for the vicinity of the intersection of Landing Road and Norris Lane, Patapsco State Park, and was observed on 15 May 2014 and submitted 5 November 2015. This locality is ca. 2.5 km W Avalon. I emailed the poster requesting confirmation, but as is typically the case received no reply. The second was for 9201 Clarke Springs Ridge and was observed and submitted on 28 April 2019. The point of observation was 0.5 km from the Patuxent River. For reasons I could not determine, the photograph was of the tail only, but the identification appears unimpeachable. This site is particularly important since it suggests a distribution along the entire length of the Patuxent River in Howard County. It is marked on the map with a broken circle. The poster and MARA project contact, cooperative in the past, did not respond to three emails about this report and the documentation for the two sites mapped in Cunningham & Nazdrowicz (2018). As such, Cunningham’s (2018) claim that MARA provided documentation for this county is currently lacking. In 75 trips (1982–2017) in this county, I found the species only twice at the sites mentioned above. Aside from the immediate environs of the Patapsco and Patuxent Rivers, there are no records for this species in this overwhelmingly Piedmont county. Essentially, this amounts to the entire county.

Montgomery County: Concerning *P. glutinosus*, Hay (1902) stated: “Rather common within our limits. I have found it most abundant about Takoma Park [Montgomery County, Maryland] and Mt. Vernon [Fairfax County, Virginia].” Despite a close association with biologists in the Washington, DC area for 42 years (Perry, 2007), oddly there are no specimens in the National Museum or elsewhere supporting his claim concerning Montgomery County. Hays’ comment notwithstanding, other biologists and naturalists have found this species difficult to find in this Piedmont county. Brady (1937) did not report *P. glutinosus* from the intensively surveyed Plummer’s Island, although specimens exist (KU 294125–294127, 17 May 1931), but were not catalogued into the KU collection until 2005 (A. P. Motta, personal communication, 2024). Manville (1968), in summarizing the vertebrate fauna of Plummer’s Island wrote: “Found at Carderock and on the Maryland shore north of the canal (Brady, 1937), and more recently on the

island and the mainland property (Brady, unpubl. notes).” Unfortunately, Manville did not provide a date or any further details for this report. Richard Highton, with and without assistants, collected the species at five localities (1956–1963); four of these sites were represented by single specimens. In 84 trips (1983–2006), I found the species at only four sites, collecting six specimens. Two localities were along the Patuxent River in the extreme northern portion of the county where the species is fairly common. MARA did not find the species in Montgomery County and there are no reports on iNaturalist. Were it not for KU 89685-89686 [5.0 miles (8.0 km) N Rockville: Rock Creek, – April 1947], *P. glutinosus* would be unknown from the eastern and central portions of the county.

Washington County: Cooper (1960, 1965) and Harris (1969, 1975) stated that *P. glutinosus* occurs in the Great Valley, although I could not determine their bases. More recently, this species was reported by Kubel et al. (2002) from Antietam National Battlefield, Sharpsburg, a site clearly in the Great Valley. This article was not cited in MARA. Cunningham (2018) stated that *P. glutinosus* was “absent from the Great Valley in Washington County ...,” yet a site she mapped for Sharpsburg immediately refuted this. Andrew P. Landsman, MARA project contact for Washington County, informed me (personal communication, 2024) that he could not account for the site plotted in MARA; it may or may not be his. However, he did find one individual on a rocky hillside above Snavelly Ford Trail, Antietam National Battlefield on 3 April 2009, just nine months before MARA officially began. A site mapped on iNaturalist that was centered on Hagerstown (Great Valley) and observed and reported on 30 May 2020 has an “Accuracy” rating of 23.29 km, meaning it could have come from anywhere within this radius of Hagerstown. The poster did not respond to my email requesting clarification. This is yet again (Miller, 2024) another potentially important but worthless site that users of iNaturalist consider “Research Grade.”

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Appendix. Specimens cited.**Specimens examined**

Allegany County: LACM 124881, 124882; NHSM 3288-3294, 3297-3300, 3302, 3461-3462; TSU 659-661, 1226, 1330-1332, 4369-4373, 7244, 8064; UF 466, 41052, 41053-41054.

Baltimore County: NHSM 1938, 2240; TSU 42, 2456-2458, 2472-2473, 2527-2528, 2877, 2881-2883, 2937, 3205-3207, 3656-3660, 3662-3663, 3672-3674, 3688-3689, 3699, 3743-3744, 4122-4123, 4156-4157, 4171, 5616-5617.

Carroll County: TSU 867, 4025, 4040, 4059, 4079, 4090, 4105-4106, 4120, 4186, 4226, 4999-5002, 5014, 5501.

Cecil County: ANSP 37835; TSU 6427-6428, 7447-7450; UF 41055.

Frederick County: AMNH 127496-127497; TSU 384, 416-419, 5665, 6362-6363, 6444-6446, 6492-6495, 8419, 10313.

Garrett County: AMNH 50845-50846; ANSP 17792-17800; NHSM 3263-3284; NHSM/HSB 309-314, 421; TSU 67, 1252-1255, 1315-1316, 1462, 1483-1484, 1951, 4295-4298, 5709, 5821, 5828, 5833, 5843-5844, 5861-5863, 5867-5869, 5899-5901, 5942, 6338, 7201-7206, 7229-7230, 7610-7612, 7632-7633, 7641, 8075-8076, 9090-9096, 9349-9353; UF 41059-41061.

Harford County: ANSP 37824; NHSM 1059, 4236; TSU 318, 3013, 4974-4975, 5098-5099, 6374-6375, 6536, 7435, 7460; UF 8409 (2).

Howard County: TSU 5421, 5477.

Montgomery County: AMNH 18881; KU 89685-89686, 294125-294127; NHSM/HSB 464; TSU 486-487, 5467-5469, 6663, 9407, 9864; USNM 309344.

Washington County: Fort Frederick State Park (TSU uncatalogued).

Specimens unexamined

Allegany County: USNM 265141, 379312-379322, 379331-379332, 379335, 379344, 379530-379539, 379550.

Baltimore County: USNM 144308.

Carroll County: USNM 376101-376102, 376348, 485019.

Cecil County: MSB 28275-28277, 28278, 28279-28282, 28283-28285, 28286-28291; USNM 160458, 363823-363828.

Frederick County: USNM 137335, 376408-376409, 376654, 376737-376738, 376863-376865, 376925-376927, 376935-376937, 377153-377157, 377686-377688, 377689, 377988-377989.

Garrett County: CM 139316-139317, 139319, 139321-139322, 139327-139329, 139335-139338, 143051-143052. USNM 379585-379590, 379599-379602, 379654-379657, 379711-379714, 379717-379720, 379878-379886, 379934-379935, 379936, 511115-511117.

Harford County: CM 27244-27247, 27248; USNM 144309, 367021, 367136, 367171-367173, 367207-367208, 367280.

Howard County: USNM 375505.

Montgomery County: USNM 373177, 373223, 374462, 374678, 375091-375094.

Washington County: USNM 263394, 378378-378379, 378392-378394, 378652-378653, 378685, 378936, 378961-378966, 379132, 379166-379168, 379169-379170, 379179-379181, 379189-379194, 378555-378558.