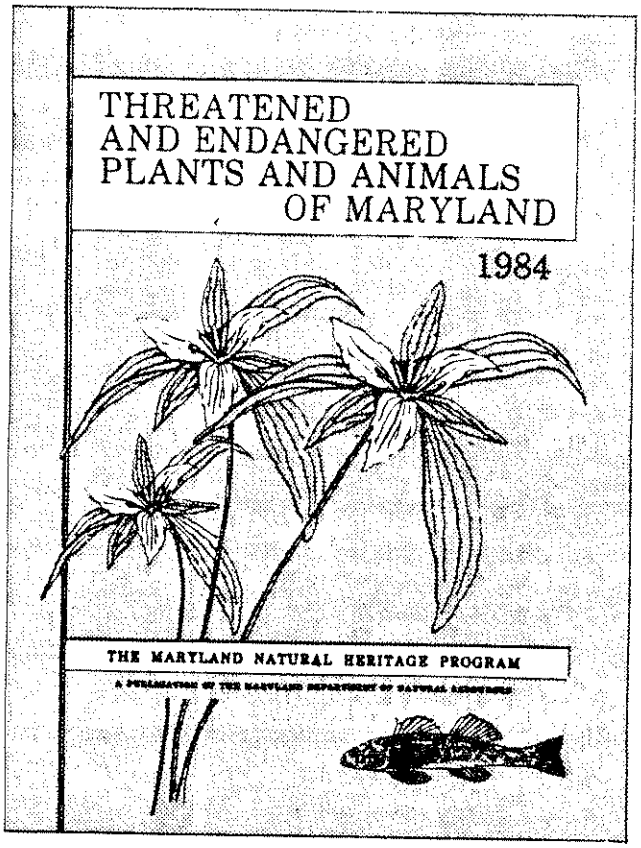
Gleason 1981

THREATENED AND ENDANGERED PLANTS AND ANIMALS OF MARYLAND

PROCEEDINGS OF A SYMPOSIUM HELD SEPTEMBER 3-4, 1981, AT TOWSON STATE UNIVERSITY, TOWSON, MARYLAND



Published by the Maryland Natural Heritage Program, this 476 page book contains thirty separate papers dealing with Maryland's rare plants and animals. Included are 22 papers presented at Towson State University in 1981, and eight others invited subsequently. All papers were fully revised and updated prior to publication. This is the first such publication for Maryland and should be an invaluable resource for naturalists, land use planners, and anyone interested in our threatened and endangered biota, or state and federal regulations concerning its management. The table of contents is reproduced on the back of this page.

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The Endangered and Threatened Freshwater Mollusks of Maryland

by
Andrew G. Gerberich
National Museum of Natural History Division of Fishes
NHB-159, Washington, D.C. 20560

Introduction

Early information on Maryland mollusks necessarily centered on the District of Columbia and the Potomac River. Washington was at that time one of the major centers of learning for the region. The early faunal lists published by Girard (1856) and Lehnert (1885) are unremarkable except for information about what was in certain streams of that time. In 1894, H.A. Pilsbry published a list of Potomac Valley mollusks. This publication is quite valuable since, even now much of western Maryland's mollusk fauna is poorly known. Lucy Reardon (1929) did an anatomical study of five unionids inhabiting the Potomac River near Washington, D.C. In that paper she presented a very good account of freshwater mussel anatomy. In 1934 Horace Richards presented a list of freshwater and land mollusks of the Washington D.C. vicinity. A large gap in time occured between Richards' paper and Johnson's 1970 monograph of Atlantic slope unios. Although Johnson's paper was concerned with the southern faunal elements of the Atlantic slope, a few of these species are also present in Maryland and his treatment of them rather good. Sam Fuller (1978) wrote about various species of the Potomac he thought were in jeopardy, while Counts (1981) worked on Delmarva Corbicula. In 1979 and 1980 Hamilton published interesting ecologic and behavioral data on Potomac river snails. Pieter Kat (1982 and 1983) did ecological work on Elliptio complanata, and the clams of Loch Raven Reservoir were studied by Long (1983).

The following species list, which contains all known species from Maryland, was compiled using literature records, data from specimens deposited in the U.S. National Museum, and localities from my own personal collection. The higher categories in the classification of the Unionidae follows Burch (1975b) and Davis and Fuller (1981) modified for Strophitini using Gordon (1980). The classification of the Sphaeriidae follows Herrington (1962) and Burch (1975a) and that of the gastropods is from Taylor and Sohl (1962) and Burch (1978 and 1982).

Acknowledgements

I wish to thank the following people for help in collecting Maryland freshwater mollusks: E. Bishop, J. Boyd, S. Chambers, T. Coffer, J. Lowry, A. Moser, A. Norden, W. Steiner, and J. Williams. Paul Dresler of the U.S. Geological survey provided a list of Sphaeriids he has collected from the lower Potomac River. I also thank David Lee of the North Carolina State Museum for permission to use their drainage maps of Maryland for this paper. A. Norden of the Maryland Department of Natural Resources provided much encouragement and help in the preparation of this paper. Thanks also to A. Bogan of the Academy of Natural Sciences of Philadelphia for reviewing an earlier draft of this paper.

Bivalvia
- Unionacea
  - Unionidae
    - Anodontinae
      - Anodontini
        - *Anodonta* (*Pyganodon*) *cataracta* Say, 1817
        - *Anodonta* (*Pyganodon*) *implicata* Say, 1829
        - *Anodonta* (*Utterbackia*) *imbecilis* Say, 1829
      - Strophitini
        - *Strophitus* (*Strophitus*) *undulatus* (Say, 1817)
      - Alasmidontini
        - *Alasmidonta* (*Alasmidonta*) *undulata* (Say, 1817)
        - *Alasmidonta* (*Decurambis*) *marginata* Say, 1817
        - *Alasmidonta* (*Decurambis*) *varicosa* (Lamarck, 1819)
        - *Alasmidonta* (*Pressodonta*) *heterodon* (Lea, 1830)
        - *Lasmigona* (*Platynaias*) *subviridis* (Conrad, 1835)
    - Ambleminae
      - Lampsilini
        - *Lampsilis ochracea* (Say, 1817)
        - *Lampsilis* (*Lampsilis*) *cariosa* (Say, 1817)
        - *Lampsilis* (*Lampsilis*) *ovata* (Say, 1817)
        - *Lampsilis* (*Lampsilis*) *radiata* (Gmelin, 1791)
        - *Ligumia nasuta* (Say, 1817)
      - Pleurobemini
        - *Elliptio* (*Elliptio*) *angustata* (Lea, 1831)
        - *Elliptio* (*Elliptio*) *complanata* (Lightfoot, 1786)
        - *Elliptio* (*Elliptio*) *fisheriana* (Lea, 1838)

Spheriacea

Corbiculidae

Corbicula fluminea (Muller, 1774)

Sphaeriidae

Musculium lacustre (Muller, 1774)
Musculium partumeium (Say, 1822)
Musculium securis (Prime, 1852)
Musculium transversum (Say, 1829)
Pisidium (*Cyclocalyx*) *adamsi* Stimpson, 1851
Pisidium (*Cyclocalyx*) *castertanum* (Poli, 1791)
Pisidium (*Cyclocalyx*) *compressum* Prime, 1852
Pisidium (*Cyclocalyx*) *equilaterale* Prime, 1852
Pisidium (*Cyclocalyx*) *fallax* Sterki, 1896
Pisidium (*Cyclocalyx*) *ferrugineum* Prime, 1852
Pisidium (*Cyclocalyx*) *lilljeborgi* Clessin, in Esmark and Hoyer, 1886
Pisidium (*Cyclocalyx*) *nitidum* Jenyns, 1852
Pisidium (*Cyclocalyx*) *variable* Prime, 1852
Pisidium (*Cyclocalyx*) *walkeri* Sterki, 1895
Pisidium (*Neopisidium*) *punctatum* Sterki, 1895
Pisidium (*Pisidium*) *dubium* (Say, 1816)
Sphaerium (*Herringtonium*) *occidentale* ("Prime" Lewis, 1856)
Sphaerium (*Sphaerium*) *fabale* (Prime, 1852)
Sphaerium (*Sphaerium*) *simile* (Say, 1816)
Sphaerium (*Sphaerium*) *striatinum* (Lamarck, 1818)

Gastropoda
Prosobranchia
Mesogastropoda
Valvatoidea
Valvatidae
Valvata bicarinata Lea, 1841
Valvata tricarinata (Say, 1817)
Ampullarioidea
Viviparidae
Viviparinae
Viviparus georgianus (Lea, 1834)
Bellamyinae
Cipangopaludina chinensis malleata (Reeve, 1863)
Lioplacinae
Campeloma decisum (Say, 1817)
Campeloma limum (Anthony, 1860)
Lioplax subcarinata (Say, 1816)
Bithyniidae
Bithynia tentaculata (Linnaeus, 1758)
Truncatelloidea
Hydrobiidae
Lithoglyphinae
Gillia altilis (Lea, 1841)
Somatogyrus (*Somatogyrus*) *pennsylvanicus* Walker, 1904
Nymphophilinae
Cincinnatia cincinnatiensis (Anthony, 1840)
Amnicolinae
Amnicola (*Amnicola*) *decisa* Haldeman, 1845
Amnicola (*Amnicola*) *limosa* (Say, 1817)
Amnicola (*Lyogyrus*) *grana* (Say, 1822)
Amnicola (*Lyogyrus*) *pupoidea* (Gould, 1841)
Pomatiopsidae
Pomatiopsis lapidaria (Say, 1817)
Vermetoidea
Pleuroceridae
Elimia virginica (Say, 1817)
Leptoxis (*Mudalia*) *carinata* (Bruguiere, 1792)

Pulmonata
  Limnophila
    Lymnaeoidea
      Lymnaeidae
        Lymnaeinae
            Fossaria (*Fossaria*) *exigua* (Lea, 1841)
            Fossaria (*Fossaria*) *humilis* (Say, 1822)
            Fossaria (*Fossaria*) *modicella* (Say, 1825)
            Fossaria (*Fossaria*) *parva* (Lea, 1841)
            Pseudosuccinea columella (Say, 1817)
            Stagnicola (*Hinkleyia*) *caperata* (Say, 1829)
            Stagnicola (*Stagnicola*) *catascopium* (Say, 1817)
            Stagnicola (*Stagnicola*) *elodes* (Say, 1821)
    Ancyloidea
      Physidae
        Physinae
            Physa skinneri Taylor, 1954
            Physella ancillaria (Say, 1825)
            Physella gyrina (Say, 1821)
            Physella (*Costatella*) *heterostropha* (Say, 1817)
      Planorbidae
        Planorbinae
          Planorbini
            Gyraulus (*Gyraulus*) *deflectus* (Say, 1824)
            Gyraulus (*Torquis*) *parvus* (Say, 1817)
          Helisomini
            Helisoma (*Helisoma*) *anceps* (Menke, 1830)
            Menetus (*Micromenetus*) *dilatatus* (Gould, 1841)
            Planorbella (*Pierosoma*) *trivolvis* (Say, 1817)
            Planorbula armigera (Say, 1821)
            Promenetus exacuous (Say, 1821)
      Ancylidae
        Ferrissinae
            Ferrissia fragilis (Tyron, 1863)
            Ferrissia rivularis (Say, 1817)
        Laevapecinae
            Laevapex fuscus (Adams, 1841)

Discussion of Endangered and Threatened Species

Freshwater mollusks are rather sedentary organisms, spending most of their lives within a small given stretch of a stream. Thus, they are subject to all the environmental perturbations possible, given that station. Environmental pollution, both point and non-point sources, along with the physical destruction of their habitats are the big destroyers of molluscan populations. In addition, freshwater unionids have, as part of their life cycle, a period of obligate parasitism to a host, usually a fish, so their lives are also dependent on the continued success of another kind of organism. Since many local fish populations are declining, this may be an additional factor in the decline of resident unionids. Often, with certain mollusks, a very slight increase in pH can be enough to doom a population. It has also been known for some time that freshwater mollusks concentrate certain chemicals in their systems (Fuller, 1974). If we are to retain a reasonably diversified molluscan fauna, the discharge of untreated waste into the aquatic environment must be stopped. One only has to compare the historic ranges of the better known freshwater mollusks with their present ranges to understand the need for wise use of our environment.

The taxonomic classification of freshwater mollusks is often a source of debate, even between specialists within certain groups. Recently, there have been attempts to use the newer techniques afforded us by our increased understanding of molecular genetics (see Davis, 1983; Davis et. al. 1981; Davis and Fuller, 1981; Kat, 1982 and 1983), with some good results. Freshwater malacologists deal with organisms that are extremely variable in their makeup. They vary not only in their external morphology, but also in characters of their anatomy. In addition, rather unrelated groups show parallel and convergent evolutionary traits, so one should not be discouraged if names change rather frequently. The attempt is being made at present to stabilize the nomenclature.

Following the list of species of concern given below, are brief discussions and maps of the known Maryland distributions of the species in question. It should be noted that much of Maryland is still yet to be explored for some of these rare species. For instance, Western Maryland, which has two rivers that are part of the Ohio river system, has not been surveyed in any systematic nature for freshwater mollusks. Two maps are not included in the species accounts. Alasmidonta marginata has not yet been collected in Maryland, and E. angustata and E. fisheriana, while certainly not common in Maryland, are species whose systematic status is still unresolved.

Endangered and Threatened Freshwater Mollusks of Maryland

Species of Concern

Species	Status
Bivalvia	
Unionidae	
Alasmidonta heterodon, Dwarf Wedge Mussel	Endangered
Alasmidonta marginata, Elktoe	Special Concern
Alasmidonta varicosa, Brook Floater	Endangered
Lasmigona subviridis, Green Floater	Endangered
Elliptio angustata, Georgia Lance	Special Concern
Elliptio fisheriana, Northern Lance	Special Concern
Sphaeriidae	
Pisidium aequilaterale, Round Pea Clam	Special Concern
Gastropoda	
Pleuroceridae	
Elimia virginica, Piedmont Elimia	Threatened

BIVALVIA; UNIONIDAE

Alasmidonta heterodon (Lea, 1830) Dwarf Wedge Mussel

HABITAT

Alasmidonta heterodon is found in rivers and creeks of varying size and flow, frequently in substrates of sandy mud at the base of the stream bank (personal observation).

DISTRIBUTION

Petitcodiac River system in New Brunswick, Canada to the Neuse River system, North Carolina. The distribution of A. heterodon is very fragmented and throughout most of its range it is extremely rare (Clarke, 1981b).

COMMENTS

Alasmidonta heterodon has been considered one of the rarest mollusks in the North America (Clarke 1970). In Maryland, so far as is known, there are two healthy populations, one in the Choptank river system, the other in the lower Potomac River. Both these populations are being monitored regularly. This species has a very wide range yet exists as only scattered populations. In New England which has, at least in the past, been the stronghold of this species, it seems to be disappearing rapidly (Douglas G. Smith and Arthur H. Clarke, Personal Communications). Also, the May 22, 1984 issue of the Federal Register lists A. heterodon as a category 2 candidate for listing as a threatened or endangered species. Alasmidonta heterodon with two lateral teeth in the right valve and one lateral tooth in the left valve, cannot be confused with any other Nearctic Unionid.

Because of the rarity of this species not only in Maryland but in all the Nearctic this species should be considered endangered. Aids in the identification of A. heterodon are: Burch (1973 and 1975b), Clarke (1981a and 1981b) and Johnson (1970).

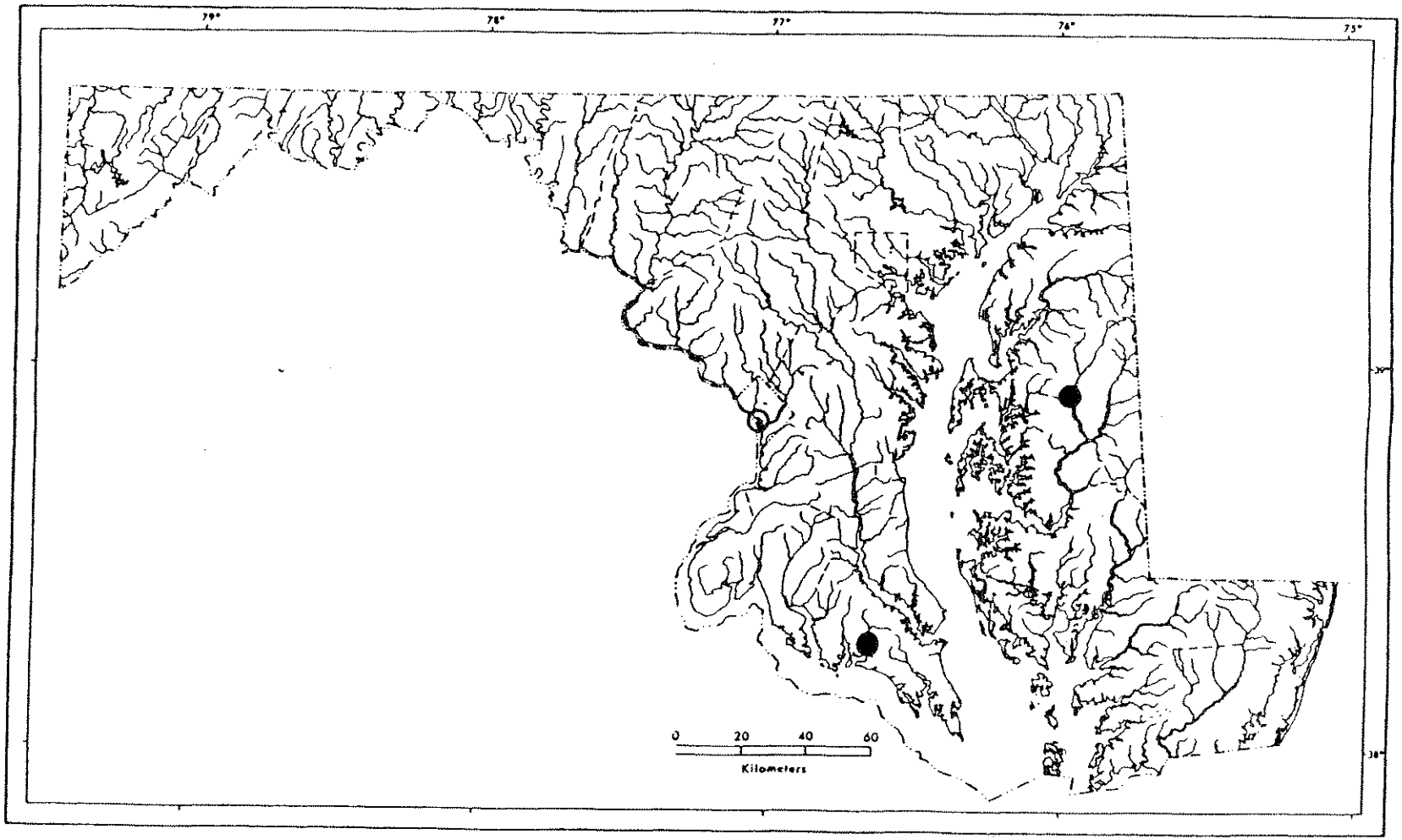

Figure 1--Geographical distribution of Alasmidonta heterodon in Maryland. Solid circles indicate collection records after 1960, hollow circles before 1960.

BIVALVIA; UNIONIDAE

Alasmidonta varicosa (Lamarck, 1819) Brook Floater

HABITAT

Alasmidonta varicosa is found in rocky and gravel substrates of small to medium size rivers and creeks, in or near swiftly flowing water (Clarke 1981b).

DISTRIBUTION

New Brunswick and Nova Scotia, Canada south to the Savannah River system, South Carolina. Clarke (1981b) reports a disjunct population from the Greenbrier River, West Virginia.

COMMENTS

Alasmidonta varicosa in northern Maryland, might be confused with A. marginata. Both these species have very distinctive sculptured posterior slopes. However, the posterior slope of A. varicosa tapers gently and is not nearly as sharp as that of A. marginata.

Clarke (1981b) reports few records for A. varicosa in Maryland, and my own collection records indicate likewise. Alasmidonta varicosa is to be considered endangered because of its rarity. Aids in identification are Burch (1975b), Clarke (1981b), and Johnson (1970).

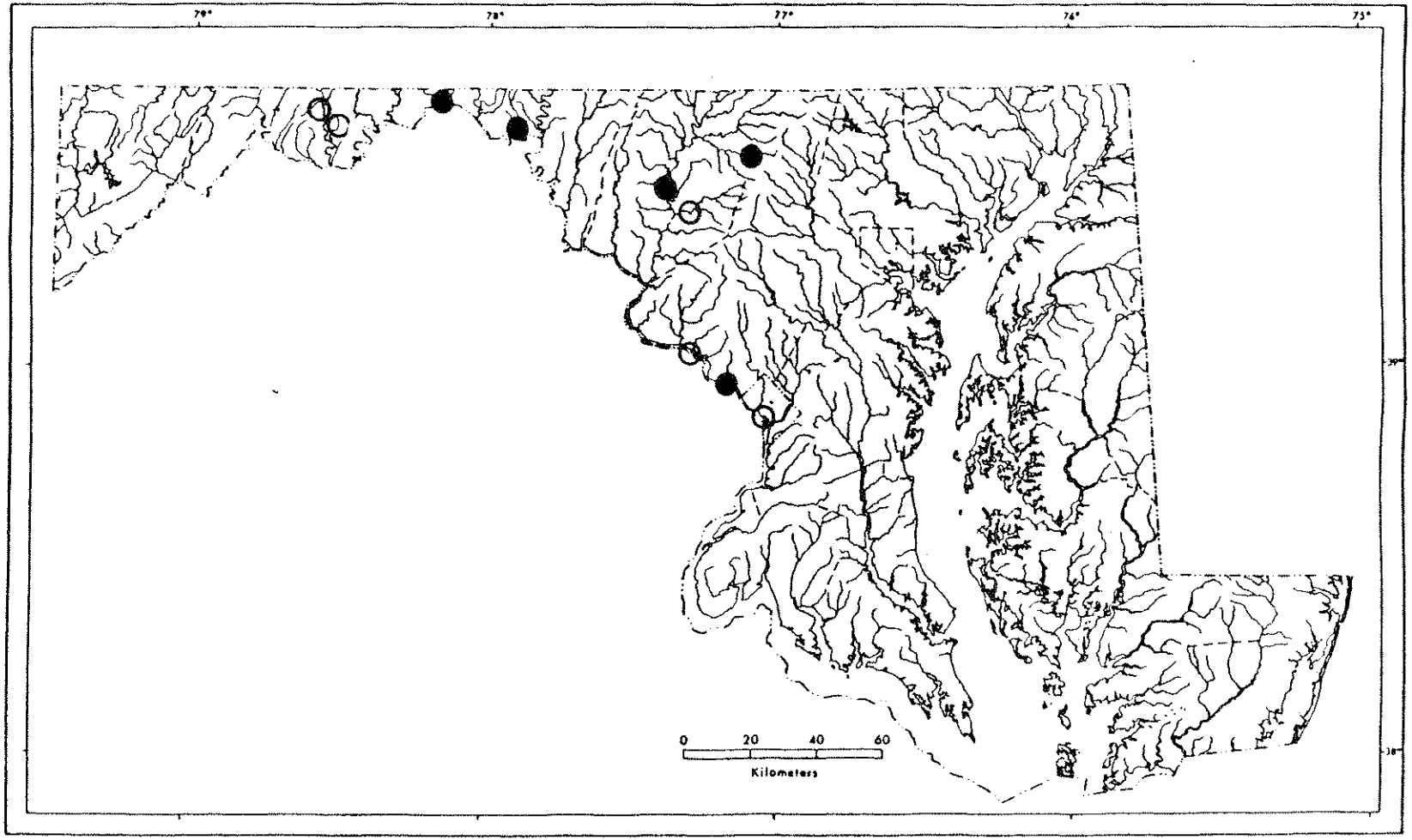

Figure 2--Geographical distribution of Alasmidonta varicosa in Maryland. Solid circles indicate collection records after 1960, hollow circles before 1960.

Alasmidonta marginata Say, 1819 Elktoe

HABITAT

Alasmidonta marginata is found in rocky and gravel substrates of larger creeks and rivers, in or near rapids or riffles (Clarke 1981b).

DISTRIBUTION

Ohio-Mississippi River system and Susquehanna River system, north to Lake Ontario and the St. Lawrence River (Clarke, 1981b).

COMMENTS

The inclusion of A. marginata as part of the Maryland fauna is expected, but it has not been collected in the state. Its presence is postulated on the basis of the myriad records along the Susquehanna in Pennsylvania (Clarke 1981b). It should be found in both Harford and Cecil Counties to the east, and perhaps in Garrett County to the West. In Garrett County, one might find both A. marginata and A. varicosa. The two species can be confused, yet are easily separated by examining the corrugated posterior slope of each. Alasmidonta marginata has a much sharper and distinctive angle to its posterior slope. Alasmidonta marginata is considered of special concern, because in Maryland it is on the periphery of its range. Aids in identification are Burch (1975b), Clarke (1981a, 1981b), and Johnson (1970).

BIVALVIA; UNIONIDAE

Elliptio angustata (Lea, 1831)	Georgia Lance
Elliptio fisheriana (Lea, 1838)	Northern Lance

HABITAT

Found in slow or swift water in substrates of sand, gravel, mud or detritus (personal observation).

DISTRIBUTION

Susquehanna River system in Pennsylvania south to the Altamaha River system in Georgia. Members of the E. lanceolata complex are also reported from the Escambia River system in northern Florida, to the Satilla River system, Georgia (Johnson, 1970).

COMMENTS

It is at present uncertain how many species makeup this taxonomically difficult complex. Four names frequently used are: E. lanceolata, E. angustata, E. producta, and E. fisheriana. Recent publications by Davis (1983) and Davis et. al. (1981) have done much to improve our knowledge of what species makeup this complex. Yet, there is still doubt as to the validity of certain specific names and I am not yet convinced that E. producta (Conrad, 1836) is distinct from E. angustata (Lea, 1831). However, I am sure that at least two species constitute the lanceolate Elliptio complex in Maryland, and since one or both may be rare, these should be considered as of special concern. Elliptio lanceolata was thought endangered by Stansbery (1971). Aids in identification are: Burch (1975b), Davis (1983), Davis et al (1981), Emerson and Jacobson (1976), Fuller (1977) and Johnson (1970).

Lasmigona subviridis (Conrad, 1835) Green Floater

HABITAT

Lasmigona subviridis seems to avoid large rivers. This species appears to prefer medium or small creeks, rivers, ponds and canals, and can be found in substrates of sand or gravel (Johnson 1970).

DISTRIBUTION

Across New York state south to the Savannah River system, South Carolina. Also in the New and Greenbrier rivers of the Kanawha River system, Virginia and West Virginia (Johnson, 1970).

COMMENTS

Lasmigona subviridis, with its relatively small size and distinctive subovate outline, lamellate pseudocardinal teeth, and left valve interdental projection cannot be confused with any other Maryland species. There are very few historical or recent records of *L. subviridis* in this state, but my own field work has revealed a small extant population in the Monocacy River in Frederick County. This species should be considered very rare in Maryland and is probably endangered. Aids in the identification of *L. subviridis* are Burch (1975b) and Johnson (1970).

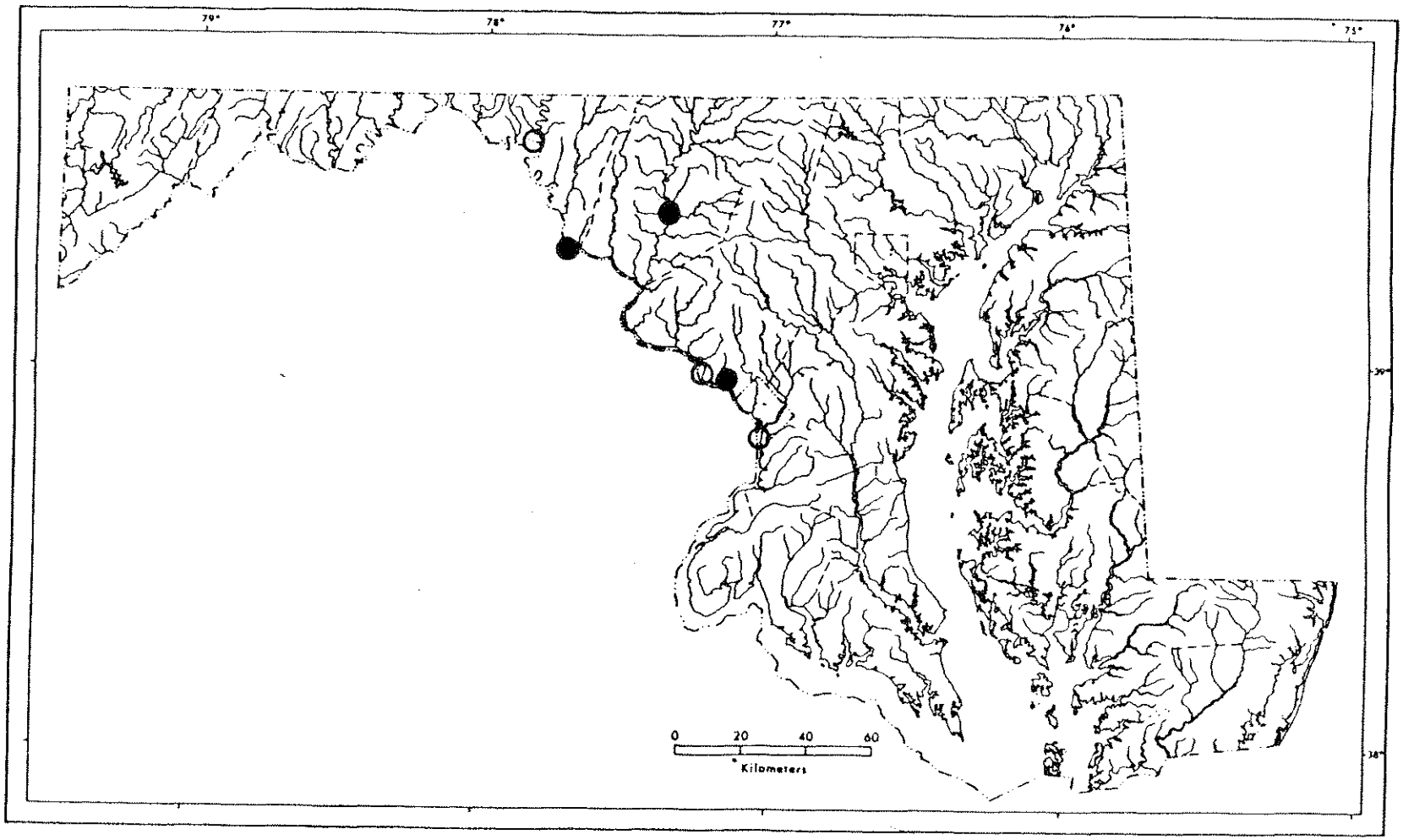

Figure 3--Geographical distribution of Lasmigona subviridis in Maryland. Solid circles indicate collection records after 1960, hollow circles before 1960.

BIVALVIA; SPHAERIIDAE

Pisidium aequilaterale Prime, 1852 Round Pea Clam

HABITAT

According to Clarke (1981a) and Herrington (1962), *P. aequilaterale* seems limited to clean rivers, creeks, ponds and lakes underlain by igneous rock formations. It can be found in fine sand substrate amongst submerged vegetation.

DISTRIBUTION

New Brunswick, Canada to eastern Lake Superior, and south to Virginia, and Illinois (Herrington, 1962).

COMMENTS

There is only one available record for *P. aequilaterale* in Maryland. Of all the sphaeriid clams present in Maryland, Mackie (1981) lists it as being the most rare nationally. Because of its rather restricted habitat and the fact that it is rarely encountered, it should probably be considered endangered. However, not enough data is available and its habitat should be sought out and population status determined before it is afforded endangered status. For this reason, I consider *P. aequilaterale* to be of special concern. While sphaeriid genera and subgenera are easily determined, the species are very difficult to separate. Aids in identification are: Burch (1972 and 1975a), Clarke (1981a), and Herrington (1962).

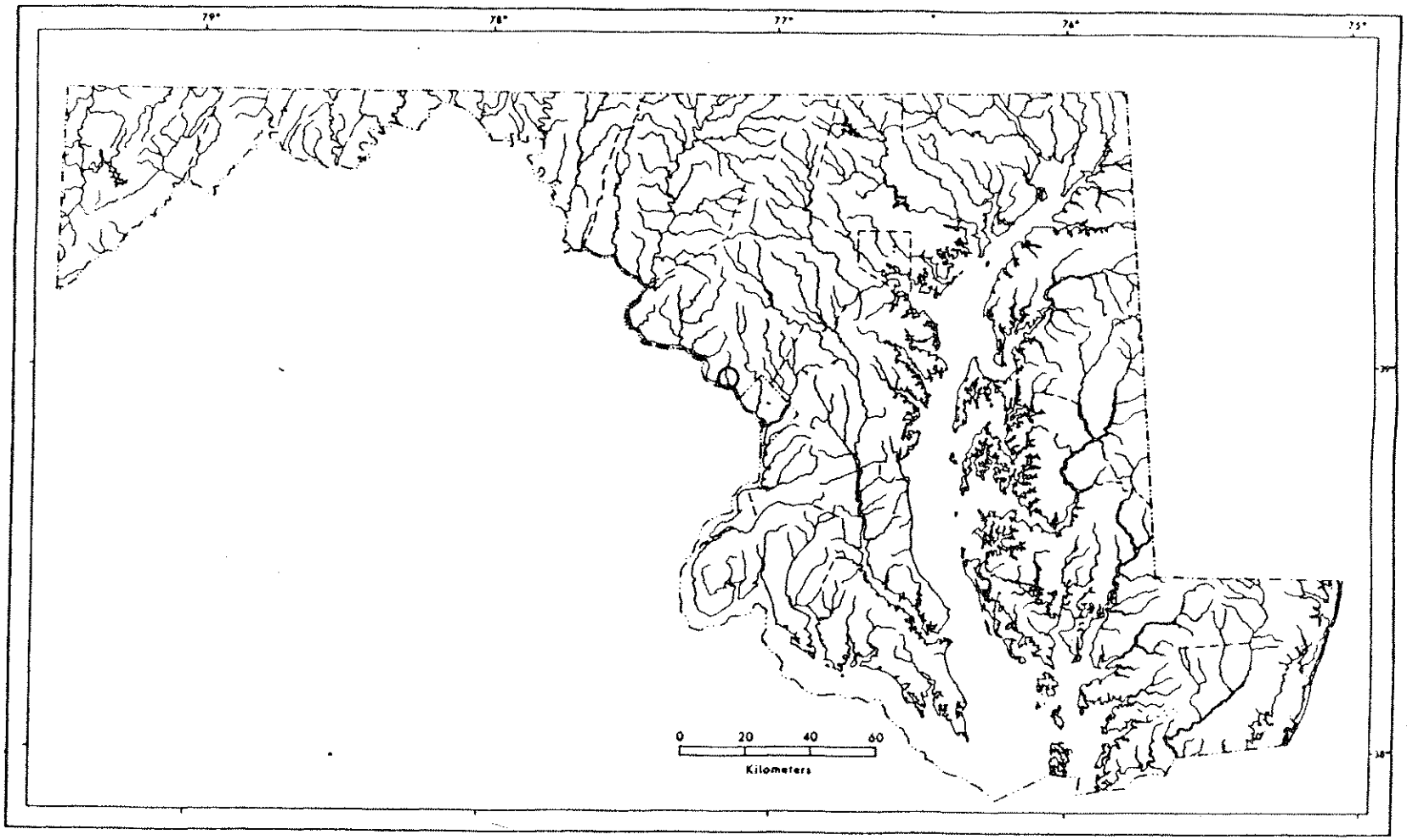

Figure 4--Geographical distribution of Pisidium aequilaterale in Maryland. Solid circles indicate collection records after 1960, hollow circles before 1960.

GASTROPODA; PLEUROCERIDAE

Elimia virginica (Say, 1817) Piedmont elimia

HABITAT

Elimia virginica is predominantly a hard water species (Jokinen and Pondick, 1981) found in clean rivers and creeks on or among rocks, in or near rather swift flowing water (personal observation).

DISTRIBUTION

Connecticut River system in Massachusetts and Connecticut south to southern Virginia (Burch, 1982).

COMMENTS

Only two pleurocerids are herein recognized as occuring in Maryland, *Elimia* (=*Goniobasis*) *virginica* and *Leptoxis* (*Mudalia*) *carinata*. They are easily separated by the fact that *L. carinata* almost always has one to three sharp spiral edges or carinae on the outer surface of the shell. These are absent in *E. virginica*.

Fuller (1978) on the Potomac River, and Jokinen and Pondick (1981) in southern New England have both documented the decline of this species in their respective study areas. While *E. virginica* can not yet be considered very rare, it is declining and now encountered rather infrequently in Maryland. The only two sizable and seemingly thriving populations I am aware of are in the Potomac River above Great Falls and the Susquehanna River below Conowingo Dam. These rivers border other states at these points.

For these reasons, I consider *E. virginica* threatened. Aids in the identification of *E. virginica* are: Burch (1982), and Emerson and Jacobson (1976).

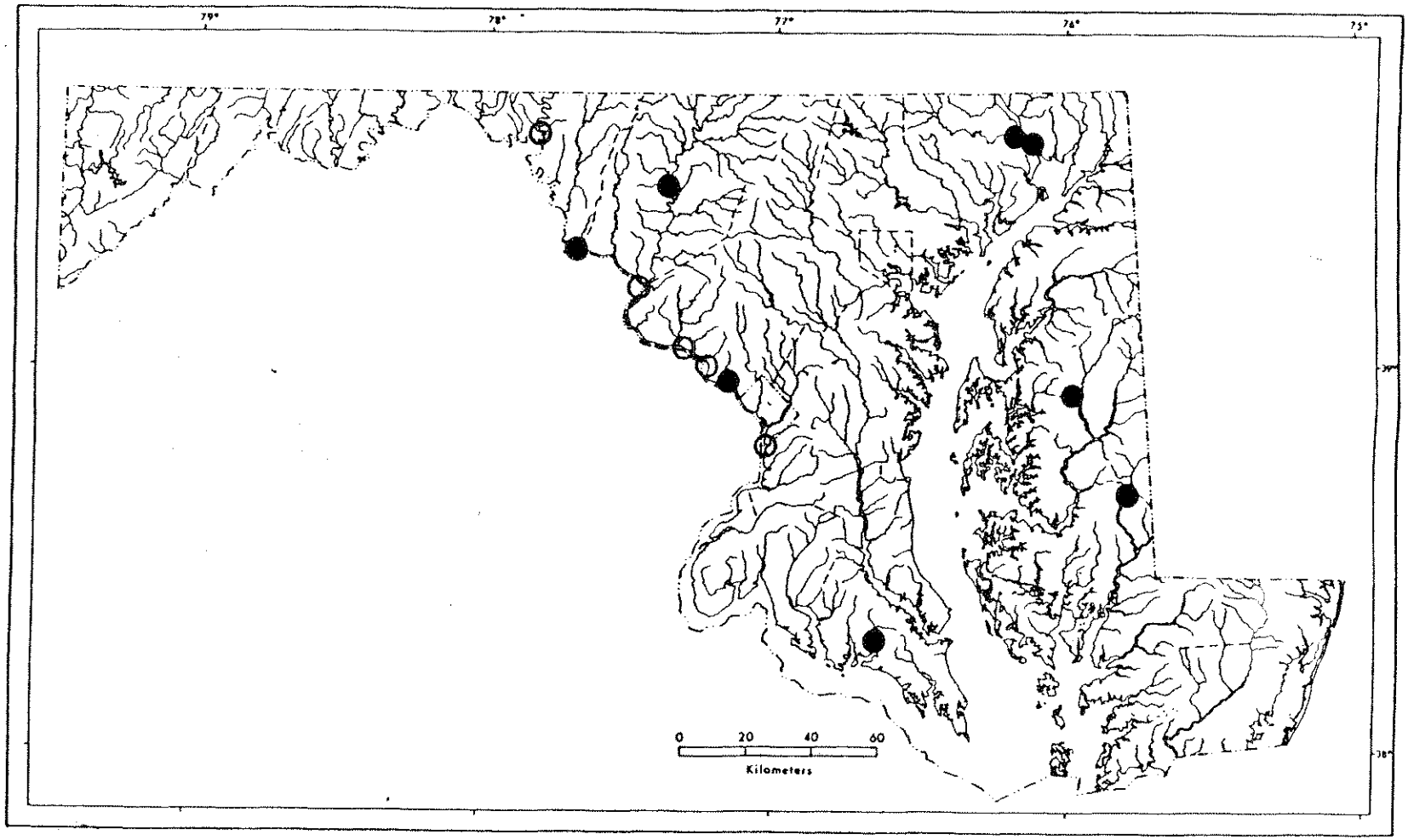

Figure 5--Geographical distribution of Elimia virginica in Maryland. Solid circles indicate collection records after 1960, hollow circles before 1960.

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