Stratigraphic Distribution and Bibliography
of Fossil Fish, Amphibians, and Reptiles from Virginia

by Robert E. Weems
U.S. Geological Survey, Reston, VA 22092

This report is preliminary and has not been reviewed for conformity with U.S. Geological Survey editorial standards and stratigraphic nomenclature

Index

Introduction................................................ 2
Paleozoic................................................... 4
  Cambrian-Silurian......................................... 4
  Devonian.................................................. 4
  Mississippian............................................. 4
  Pennsylvanian............................................. 5
  Permian................................................... 5
Mesozoic.................................................... 6
  Triassic.................................................. 6
  Jurassic.................................................. 12
  Cretaceous............................................... 14
Cenozoic.................................................... 15
  Tertiary.................................................. 15
    Paleocene............................................... 15
    Eocene.................................................. 18
    Oligocene............................................... 21
    Miocene............................................... 22
    Pliocene............................................... 28
  Quaternary............................................... 29
    Pleistocene............................................. 29
    Holocene............................................... 39
  Literature cited........................................... 40
  Acknowledgements.......................................... 49
Introduction

The following stratigraphic compilation and bibliography represent a preliminary attempt to bring together all available literature and identified records of fossil fish, amphibians, and reptiles discovered in the State of Virginia. Most of this list is bibliographic, representing specimens which have been described in the formal literature. However, a few specimens not yet in the literature are also included. Those in possession of the author should, in the course of the next few years, find their way into the literature. Other listed specimens are in the U.S. National Museum collections; they can be found by referring to the listed catalogue numbers.

No attempt was made here to compile detailed references on fossil mammals and birds from Virginia. To date, apparently all mammal and bird remains have come from strata of Miocene to Holocene age. A recent compilation of the Pleistocene bird and mammal record is given in the "Quaternary of Virginia" (Virginia Division of Mineral Resources Publication 75, 1986), and much of the information available on Miocene mammals and birds can be found in "Stratigraphy and paleontology of the outcropping Tertiary beds in the Pamunkey River Region" (Central Virginia Coastal Plain (Guidebook for the 1984 Field Trip of the Atlantic Coastal Plain Geological Association, 1984, edited by L.W. Ward and Kathleen Krafft). These sources should take the interested reader a long way toward finding the available literature on mammals and birds.

Fish remains have not been reported yet from Cambrian, Ordovician, or Silurian strata, and neither fish, amphibian, nor reptile remains have been reported yet from Pennsylvanian, Cretaceous, or Oligocene strata. However, units representing all of these periods exist in Virginia and have potential for yielding fossil vertebrates as attested by the occurrence of fossil fish, reptiles, and amphibians in strata of these ages in nearby states. Similarly, the known fauna from the Devonian,
Mississippian, Triassic, Jurassic, Cretaceous, Paleocene, Eocene, Miocene, Pliocene, Pleistocene, and Holocene surely represent only part of the total fauna present during those ages, for records of nearby states include numerous taxa not yet known from Virginia. Thus, the present list surely represents only a fraction of the total number of fossil fish, amphibians, and reptiles ultimately to be found within the state borders.

Most of the listed taxa are represented by skeletal remains, but some are represented only by footprints. Footprint taxa are denoted by an (*) to set them off from osteological taxa. Formation names are given for the source beds of the described remains except for Quaternary occurrences in the western part of the state. In that region, remains come from fissure deposits for which there is no formal nomenclature.

No attempt has been made to catalogue these occurrences by geographic locality. However, the geographic distribution of geologic strata in Virginia allow for at least some ready localization of fossil remains. Paleozoic vertebrate fossils (Devonian, Mississippian) have been found only west of the Blue Ridge Mountains. Mesozoic vertebrate fossils (Triassic and Jurassic) have been found only in the Piedmont region, which lies between the Blue Ridge and the Fall Line (roughly marked by Interstate 95). Tertiary vertebrate fossils have all come from the Coastal Plain, which lies east of the Fall Line. Pleistocene remains have been found both in the Coastal Plain and in the region west of the Blue Ridge.
PALEOZOIC

Cambrian - Ordovician - Silurian

(Rocks of these ages so far have yielded no fish remains; Ordovician fish have been reported from Maryland and Silurian fish have been reported from West Virginia)

Devonian

Pisces
Placodermi
Bothriolepidae

Bothriolepis virginiensis Weems, Beem, and Miller 1981
-- Chemung Formation, Frederick County (Weems and others, 1981)

Acanthodii

Acanthodian spines? -- Chemung Formation, Frederick County (Weems and others, 1981)

Mississippian

Cotylosauria

Asperipes aduncus* (Branson 1910) -- Hinton Formation, Giles County (Branson, 1910; taxonomically updated in Haubold, 1971) (probably the oldest known reptilian remains)
Pennsylvanian

(No fossil amphibians or reptiles yet are reported from Virginia, material known from West Virginia)

Permian

(No known beds of this age are present in Virginia, material known from West Virginia)
MESOZOIC

Triassic

Pisces
Osteichthyes

Paleoniscidae

*Turseodus* sp. -- Cow Branch Formation, Pittsylvania County (Olsen and others, 1989)

Redfieldiidae

*Dictyopyge macrurus* (W.C. Redfield 1841) -- Barren beds, Productive Coal Measures, and Vanita beds, Chesterfield County and Goochland County; Falling Creek Formation, Hanover County; Scotsburg basin, Halifax County (Schaeffer and McDonald, 1978, Olsen and others, 1982)

*Cionichthys meekeri* (Schaeffer and McDonald 1978) -- Barren beds, Productive Coal Measures, Chesterfield County and Goochland County; Falling Creek Formation, Hanover County (Schaeffer and McDonald, 1978; Olsen and others, 1989, p. 54)

*Cionichthys* sp. -- Cow Branch Formation, Pittsylvania County (Olsen and others, 1989)

*Synorichthys* sp. -- Cow Branch Formation, Pittsylvania County (Olsen and others, 1989)

*Tanaocrossus* sp. -- Vinita beds, Richmond basin, county uncertain (Schaeffer and McDonald, 1978; Olsen and others, 1989, p. 54)
Semionotidae

Semionotus sp. -- Cow Branch Formation, Pittsylvania County (Olsen and others, 1989)

Semionotus sp. -- Balls Bluff Siltstone, Culpeper basin (county unrecorded) (Olsen, 1989)

Coelacanthidae

Osteoleurus newarki (Bryant 1934) -- Cow Branch Formation?, Pittsylvania County (Schaeffer and McDonald, 1978)

Osteoleurus sp. -- Cow Branch Formation, Pittsylvania County (Olsen and others, 1989)

cf. Pariostegus sp. -- Cow Branch Formation, Pittsylvania County (Olsen and others, 1989)

Diplurus sp. -- Balls Bluff Siltstone, Loudoun County (Weems and Kimmel, 1993)

Reptilia

Lepidosauria

Sphenodontidae

cf. Diphydontosaurus -- Vinita beds, Chesterfield County (Sues and Olsen, 1990)

Tanystropheidae

Gwyneddosaurus erici Bock 1945 -- Cow Branch Formation, Pittsylvania County (Olsen, 1979) (Tanytrachelos ahynis Olsen 1979 is a junior synonym of this taxon)
Gwyneddichnium sp.* -- Balls Bluff Siltstone, Prince William County (Weems and Kimmel, 1993; illustrated and identified as Rhynchosauroides in Gore, 1990)

Archosauria
Crurotarsi
Doswelliidae

Doswellia kaltenbachi Weems 1980 -- Falling Creek Formation, Hanover County (Weems, 1980a)

Parasuchidae

Rutiodon carolinensis Emmons 1857 -- Falling Creek Formation, Hanover County (Weems, 1980a)

Rutiodon sp. -- Balls Bluff Siltstone, Culpeper County (Weems, 1992); Balls Bluff Siltstone, Loudoun County (Weems, 1979); Cow Branch Formation, Pittsylvania County (Olsen and Baird, 1986)

Parasuchipus harrisi Litwin and Weems 1993 -- Balls Bluff Siltstone, Culpeper County; Cow Branch Formation, Pittsylvania County (Olsen and others, 1989; Litwin and Weems, 199_)

Aetosauridae

aetosaur trackways* (not yet named) -- Balls Bluff Siltstone, Culpeper County (Weems, 1992; Litwin and Weems, 199_)

Rauisuchidae

gen. et sp. indet. (proximal end of humerus and two
vertebrae) -- Falling Creek Formation, Hanover County (Weems, 1980a)

Chirotherium lulli* Bock 1952 -- Manassas Sandstone, Fairfax County (Weems and Kimmel, 1993)

Poposauridae?

Brachychirotherium parvum* (C.H. Hitchcock 1889) -- Manassas Sandstone, Fairfax County (Weems and Kimmel, 1993)

Crurotarsi incertae sedis

Euscolosuchus olseni Sues 1992 -- Vinita Beds, Chesterfield County (Sues, 1992)

Ornithosuchia
Saurischia
"Ceratosauria"

Grallator tuberosus* (E. Hitchcock 1836) -- Cow Branch Formation, Pittsylvania County (Olsen and Baird, 1986, Weems, 1992; "Atreipus" is synonymous with Grallator); Balls Bluff Siltstone, Prince William County (unpublished, specimen in possession of author)


Grallator sillimani* (E. Hitchcock, 1843) -- Balls Bluff Siltstone, Culpeper County (Weems, 1987, 1992)

Kayentapus minor* (E. Hitchcock, 1858) -- Balls Bluff Siltstone, Culpeper County (Weems, 1987, 1992)
Prosauropoda?

**Eubrontes sp.** -- Balls Bluff Siltstone, Culpeper County (Weems, 1987, 1992) (not certainly *Eubrontes*, but closer to that taxon than anything so far described; possibly a poposaurid print)

Sauropoda

**Agrestipus hottoni** * Weems 1987 -- Balls Bluff Silstone, Culpeper County (Weems, 1987, 1992)

Ornithischia

Ornithopoda

**Gregaripus bairdi** * Weems 1987 -- Balls Bluff Siltstone, Culpeper County (Weems, 1987, 1992)

Archosauria incertae sedis

**Uatchitodon kroehleri** Sues 1991 -- Vinita Beds, Chesterfield County (Sues, 1991)

**Plesiornis pilulatus** * E. Hitchcock 1858 -- Poolesville Member, Manassas Sandstone, Fairfax County (Weems and Kimmel, 1993) (possibly a bird footprint)

Synapsida

Traversodontidae

**Boreogomphodon jeffersoni** Sues and Olsen 1990 -- Vinita beds, Chesterfield County (Sues and Olsen, 1990)
Chiniquodontidae

Microconodon tenuirostris Emmons 1856 -- Vinita beds, Chesterfield County (Sues and Olsen, 1990)
**Jurassic**

**Pisces**

**Redfieldiidae**

*Redfieldius gracilis* (J.H. Redfield 1837) -- Midland Formation, Fauquier County; Waterfall Formation, Prince William County (Baer and Martin, 1949; Parrott and Dunkle, 1949; Schaeffer and McDonald, 1978; Olsen and others, 1982; "Dictyopyge" listed in Parrott and Dunkle, 1949, was probably a Redfieldius)

**Semionotidae**

*Semionotus* spp. -- Midland Formation, Fauquier County; Waterfall Formation, Prince William County (Parrott and Dunkle, 1949; Schaeffer and McDonald, 1978; Olsen and others, 1982)

**Ptycholepidae**

*Ptycholepis marshi* Newberry 1878 -- Midland Formation, Fauquier County; Waterfall Formation, Prince William County (Parrott and Dunkle, 1949; Schaeffer and others, 1975; Schaeffer and McDonald, 1978; Olsen and others, 1982)

**Coelacanthidae**

*Diplurus longicaudatus* Newberry 1878 -- Midland Formation, Fauquier County; Waterfall Formation, Prince William County (Baer and Martin, 1949; Schaeffer and McDonald, 1978; Olsen and others, 1982)
Reptilia

Archosauria

Crocodilia

Protosuchidae

*Batrachopus* sp. -- Turkey Run Formation, Loudoun County
(unpublished, specimen in possession of author and
mentioned in Weems and Kimmel, 1993)

Saurischia

"Ceratosauria"

*Grallator tenuis* E. Hitchcock 1858 -- Turkey Run
Formation, Loudoun County (Pannel, 1985; compare to
Weems, 1992 for updated taxonomy)

Prosauropoda

*Eubrontes giganteus* (E. Hitchcock 1836) -- Turkey Run
Formation, Loudoun County (Roberts, 1928; Pannel, 1985;
compare to Weems, 1992 for updated taxonomy)

*Eubrontes minusculus* (E. Hitchcock 1858) -- Turkey Run
Formation, Loudoun County (Gilmore, 1924; Pannel, 1985;
compare to Weems, 1992 for updated taxonomy)
Cretaceous

(No vertebrate fossils are yet reported from the Potomac Formation in Virginia, vertebrate remains are known from beds of similar age in Maryland)
CENOZOIC

Tertiary

Paleocene

Pisces

Chondrichthyes

Selachii

Lamnidae

Otodus obliquus Agassiz 1843 -- Aquia Formation, Stafford County, Richmond (Clark, 1895, 1896; Eastman, 1901; Clark and Miller, 1912; Leriche, 1942)

Striatolamia macrota (Agassiz 1843) -- Aquia Formation, Stafford County, King George County (Clark, 1895, 1896; Eastman, 1901; Clark and Miller, 1912; Leriche, 1942)

Batoidea

Myliobatidae

Myliobatis dixoni Agassiz 1843 -- Aquia Formation, King George County, Stafford County (Clark, 1895, 1896; Eastman, 1901; Clark and Miller, 1912; Leriche, 1942)

Aetobatis irregularis Agassiz 1843 -- Aquia Formation, Stafford County (Eastman, 1901; Leriche, 1942)

Osteichthyes

Phylloodontidae

Phylodus toliapicus Agassiz 1839 -- Aquia Formation,
Richmond, King George County (Wyman, 1850; Gildersleeve, 1933; Leriche, 1942)

Albulidae

**Paralbula oweni** (Owen 1845) — Aquia Formation, Stafford County (Weems, 1984, 1991)

Ostraciidae

**Ostracion meretrix** Daimeries 1891 — Aquia Formation, Stafford County (Leriche, 1942)

Reptilia

Chelonia

Trionychidae

**Aspiderites virginianus** (Clark 1895) — Aquia Formation, Stafford County (Clark, 1895, 1896; Case, 1901; Clark and Miller, 1912; Lynn, 1929; Weems, 1988) (R.E. Weems has found fragments of this taxon in Hanover County which represent an unpublished occurrence)

Cheloniidae

**Osteopygis roundsi** Weems 1988 — Aquia Formation, Caroline County (Weems, 1988)

Dermochelyidae

**Allopleuron insularis** (Cope 1872) — Aquia Formation, Stafford County (Weems, 1988)
family incertae sedis

**Planetochelys savoiei** Weems 1988 -- Aquia Formation, Stafford County (Weems, 1988; Hutchison and Weems, 1991; this is functionally a "box" turtle of uncertain familial designation, not a sinemydid as originally thought by Weems, 1988)

Lepidosauria
   Paleophidae

   **Paleophis virginianus** Lynn 1934 -- Aquia Formation, King George County (Lynn, 1934; Weems and Herman, 1983; Weems, 1984)

Archosauria
   Crocodilidae

   **Thecachampsa contusor** Cope 1867 -- Aquia Formation, Stafford County (Case, 1901; Clark and Miller, 1912; now USNM 009365)

   **Thoracosaurus neocesariensis** (DeKay 1842) -- Aquia Formation, Stafford County (unpublished, USNM 000003, USNM 000072)
Eocene

Pisces

Selachii

**Abdounia beaugei** (Arambourg 1935) -- Piney Point Formation, Hanover County (Ward and Wiest, 1990)

**Abdounia lapierrei** Cappetta & Nolf 1981 -- Piney Point Formation, Hanover County (Ward and Wiest, 1990)

**Abdounia recticona** (Winkler 1873) -- Piney Point Formation, Hanover County (Ward and Wiest, 1990)

**Carcharhinus gibbesi** (Woodward 1889) -- Piney Point Formation, Hanover County (Ward and Wiest, 1990)

**Carcharias acutissima** (Agassiz, 1844) -- Piney Point Formation, Hanover County (Ward and Wiest, 1990)

**Carcharias hopei** (Agassiz 1843) -- Piney Point Formation, Hanover County (Ward and Wiest, 1990)

**Carcharocles auriculatus** (Blainville, 1818) -- Piney Point Formation, Hanover County (Ward and Wiest, 1990)

**Galeocerdo latidens** (Agassiz 1843) -- Nanjemoy Formation, King George County (Eastman, 1901; Clark and Miller, 1912); Piney Point Formation, Hanover County (Ward and Wiest, 1990)

**Galeorhinus ypresiensis** Casier 1946 -- Piney Point Formation, Hanover County (Ward and Wiest, 1990)
?Hemipristis sp. -- Piney Point Formation, Hanover County (Ward and Wiest, 1990)

*Isurus praecursor* -- Piney Point Formation, Hanover County (Weems, 1984; Ward and Wiest, 1990)

*Jaekelotodus trigonalis* (Jaekel, 1895) -- Piney Point Formation, Hanover County (Ward and Wiest, 1990)

*Nebrius thielensis* (Winkler 1873) -- Piney Point Formation, Hanover County (Ward and Wiest, 1990)

*Otodus obliquus* Agassiz 1843 -- Nanjemoy Formation, Caroline County, Prince George County (Clark, 1895, 1896; reference in Clark, 1896 to "Front Royal" should be to Port Royal as indicated on p. 45)

*Physogaleus secundus* (Winkler 1874) -- Piney Point Formation, Hanover County (Ward and Wiest, 1990)

*Scyliorhinus gilberti* Casier 1946 -- Piney Point Formation, Hanover County (Ward and Wiest, 1990)

*Sphyra* sp. -- Nanjemoy Formation, King George County (Eastman, 1901; Leriche, 1942)

*Striatolamia macrota* (Agassiz 1843) -- Nanjemoy Formation, Caroline County, King George County, Prince George County (Clark, 1895, 1896; Eastman, 1901; Clark and Miller, 1912; Leriche, 1942; reference in Clark, 1896, to "Front Royal" should be to Port Royal as indicated on p. 45); Piney Point Formation, Hanover County (Ward and Wiest, 1990)
Batoidea

**Aetobatis irregularis** (Agassiz 1843) -- Piney Point Formation, Hanover County (Ward and Wiest, 1990)

**Coupatezia woutersi** (Winkler 1874) -- Piney Point Formation, Hanover County (Ward and Wiest, 1990)

**Myliobatis dixoni** Agassiz 1843 -- Nanjemoy Formation, King George County (Eastman, 1901; Clark and Miller, 1912; Leriche, 1942); Piney Point Formation, Hanover County (Ward and Wiest, 1990)

**Pristis brachyodon** Cope 1869 -- Nanjemoy Formation, Petersburg (Cope 1869b; Leriche, 1942)

**Pristis lathami** Galeotti 1837) -- Piney Point Formation, Hanover County (Ward and Wiest, 1990)

**Rhinobatos bruxelliensis** (Jaekel 1894) -- Piney Point Formation, Hanover County (Ward and Wiest, 1990)

**Rhynchobatus vincenti** Jaekel 1894 -- Piney Point Formation, Hanover County (Ward and Wiest, 1990)

Osteichthyes

Xiphiidae

**Cylindracanthus rectus** (Agassiz 1844) -- Nanjemoy Formation, Petersburg (Leriche, 1942)
Oligocene

(no fish, amphibians or reptiles presently described from Virginia, nearest material known from South Carolina)
Miocene

Pisces

Selachii

Notidanidae

Notorynchus primigenius (Agassiz 1843) -- Choptank Formation, Richmond (Leriche, 1942)

Lamnidae

Isurus hastalis (Agassiz 1843) -- Calvert Formation, Stafford County (Clark, 1895, 1896; specimen was assigned by Clark to the "Eocene", but this taxon is not elsewhere known from the Paleocene/Eocene Pamunkey Group and is typical of the Miocene so it is here considered to have come from the Calvert which is the only fossiliferous Miocene unit known from that area); Choptank Formation, Westmoreland County (Leriche, 1942); Eastover Formation, Prince George County (Clark, 1895, 1896; specimen was assigned by Clark to the Eocene, but this taxon is not known elsewhere from the Paleocene/Eocene Pamunkey Group and is typical of the Miocene so it is here considered to have come from the Eastover Formation which occurs above the Eocene in this area according to Ward and Blackwelder, 1980)

Isurus retroflexa (Agassiz 1843) -- Choptank Formation, Westmoreland County (Leriche, 1942)

Alopias grandis (Leriche 1942) -- Calvert Formation, Westmoreland County (Leriche, 1942)

Procarcharodon angustidens (Agassiz 1843) -- Calvert Formation, King George County (Weems, 1984)
Procarcharodon megalodon -- Calvert Formation, Westmoreland County (R.E. Weems collection, unpublished record); Eastover Formation, Westmoreland County (Weems, 1984) and King William County (R.E. Weems collection, unpublished record); Calvert Formation, King George County (Clark, 1895, 1896, called this "Carcharodon polygyrus" and considered it to be Eocene in age, but Clark and Miller, 1912, noted Miocene (Calvert) along the Potomac Creek bluff (p. 95) and this taxon is almost certainly Procarcharodon megalodon, so it is here considered to be a Calvert occurrence); Eastover Formation, Prince George County (Clark 1895, 1896, called this occurrence "Carcharodon polygyrus" and considered it to be Eocene in age, but Ward and Blackwelder, 1980, noted Miocene (Eastover) above the Nanjemoy at this locality and this taxon is almost certainly Procarcharodon megalodon, so it is here considered to be an Eastover occurrence)

Procarcharodon sp. -- Calvert Formation, King William County (Kimmel and Purdy, 1984; published as Carcharodon)

Carcharhinidae

Prionodon egertoni (Agassiz 1844) -- Calvert Formation, Westmoreland County; Choptank Formation, Westmoreland County, Richmond (Leriche, 1942)

Galeocerdo aduncus Agassiz 1843 -- Calvert Formation, Stafford County (Clark, 1895, 1896; specimen was assigned by Clark to the "Eocene", but this taxon is not elsewhere known from the Paleocene/Eocene Pamunkey Group and is typical of the Miocene so it is here considered to have come from the Calvert which is the only
fossiliferous Miocene unit known from that area); Choptank Formation, Westmoreland County (Leriche, 1942); Eastover Formation, Prince George County (Clark, 1895, 1896; specimen was assigned by Clark to the Eocene, but this taxon is not known elsewhere from the Paleocene/Eocene Pamunkey Group and is typical of the Miocene so it is here considered to have come from the Eastover Formation which occurs above the Eocene in this area according to Ward and Blackwelder, 1980)

Hemipristis serra Agassiz 1843 -- Calvert Formation, Richmond; Choptank Formation, Westmoreland County (Wyman, 1850; Leriche, 1942)

Sphyrnidae

Sphyrna sp. -- Calvert Formation, King William County

Rhincodonidae

Rhincodon sp. -- Calvert Formation, King William County (Kimmel and Purdy, 1984)

Batoidea

Myliobatidae

Aetobatis arcuatus Agassiz 1843 -- Choptank Formation, Westmoreland County (Leriche, 1942)

Dasyatidae

Dasyatis sp. -- Calvert Formation, King William County (Kimmel and Purdy, 1984)
**Osteichthyes**

**Acipenseridae**

*Acipenser ornatus* Leidy 1873 -- Calvert Formation, Westmoreland County (Weems, 1974b)

*Acipenser* sp. -- Calvert Formation, King William County (Kimmel and Purdy, 1984; R.P. Purdy, written communication, 1993)

**Sphyraenidae**

*Sphyraena speciosa* Leidy 1856 -- Calvert Formation, Westmoreland County (Leriche, 1942; Weems, 1974b)

**Ariidae**

*Arius* sp. -- Calvert Formation, King William County (Kimmel and Purdy, 1984; R.P. Purdy, written communication, 1993)

**Sciaenidae**

*Pogonias multidentatus* Cope 1869 -- Eastover Formation, Westmoreland County, Richmond (Wyman, 1850; Cope, 1869b; Weems, 1974b)

**Labridae**

*Protautoga conidens* Leidy 1873 -- Calvert Formation, Westmoreland County; Choptank Formation, Richmond (Leidy, 1873a, 1873b; Leriche, 1942; Weems, 1974b)
Clupeidae

*cf. Alosa* sp. -- Eastover Formation, King William County (Kimmel and Purdy, 1984)

Scombridae

*cf. Katsumonus pelamis* -- Calvert Formation, King William County (Kimmel and Purdy, 1984)

Istiophoridae

*Istiophorus calvertensis* Berry 1917 -- Eastover Formation, Prince George County (Berry, 1917; Kimmel and Purdy, 1984)

Branchiostegidae

*Lophalotilus* sp. -- Calvert Formation, Westmoreland County (Kimmel and Purdy, 1984; R.P. Purdy, written communication, 1993)

Diodontidae

*Chilomycterus* sp. -- Calvert Formation, Westmoreland County (Kimmel and Purdy, 1984; R.P. Purdy, written communication, 1993)

Molidae

*Ranzania grahami* Weems 1985 -- Calvert Formation, Westmoreland County (Berry, 1941; Weems, 1985)

*Ranzania tenneyorum* Weems 1985 -- Calvert Formation, King William County (Weems, 1985)
Reptilia

Chelonia

Cheloniidae

**Syllomus aegyptiacus** (Lydekker 1889) -- Calvert Formation, Hanover County, Westmoreland County (Cope, 1896; Berry and Lynn, 1936; Berry, 1937; Weems, 1974a; Weems, 1980b)

**Procolpochelys grandaeva** Leidy 1851 -- Calvert Formation, Westmoreland County, "near Pamunkey River" (Weems, 1974a)

Dermochelyidae

**Psephophorus calvertensis** Palmer 1908 -- Calvert Formation, Choptank Formation, Westmoreland County (unpublished occurrences, USNM 357848, USNM 357173-357202, USNM 357751-357762, USNM 357783, USNM 357785-357798, USNM 357800, USNM 357876-357877, USNM 357879-357881, USNM 358871)

Archosauria

Crocodilidae

**Gavialosuchus antiquus** (Leidy, 1852) -- Choptank Formation, Westmoreland County (Leidy, 1852) (also USNM 024877, USNM 024890, USNM 025243)

**Thecachampsa contusor** Cope 1867 -- Calvert Formation, Westmoreland County (unpublished, USNM 355964)

**Thecachampsa** sp. -- Eastover Formation, Westmoreland County (unpublished, USNM 336174)
Pliocene

Pisces

Selachii
  Carcharhinidae

Prionodon egertoni (Agassiz 1844) -- Yorktown Formation, Chesapeake or Suffolk County (Leriche, 1942)
Quaternary

Pleistocene

Pisces

Selachii

Carchariidae

*Carcharias* sp. -- Kempsville Formation, Princess Anne County (Ray and others, 1968)

Carcharhinidae

*Carcharhinus* sp. -- Kempsville Formation, Princess Anne County (Ray and others, 1968)

Batoidea

Rajidae

*Raja* sp. -- Kempsville Formation, Princess Anne County (Ray and others, 1968)

Dasyatidae

*Dasyatis* sp. -- Kempsville Formation, Princess Anne County (Ray and others, 1968)

Myliobatidae

*Myliobatis* sp. -- Kempsville Formation, Princess Anne County (Ray and others, 1968)

Osteichthyes

Clupeidae
Brevoortia sp. -- Kempsville Formation, Princess Anne County (Ray and others, 1968)

Batrachoididae

Opsanus sp. -- Kempsville Formation, Princess Anne County (Ray and others, 1968)

Lophiidae

Lophius sp. -- Kempsville Formation, Princess Anne County (Ray and others, 1968)

Gadidae

Gadus sp. -- Kempsville Formation, Princess Anne County (Ray and others, 1968)

Triglidae

Prionotus sp. -- Kempsville Formation, Princess Anne County (Ray and others, 1968)

Lutianidae

Lutianus sp. -- Kempsville Formation, Princess Anne County (Ray and others, 1968)

Sciaenidae

Sciaenops sp. -- Kempsville Formation, Princess Anne County (Ray and others, 1968)

Sphyraenidae

Sphyraena sp. -- Kempsville Formation, Princess Anne County (Ray and others, 1968)
County (Ray and others, 1968)

Uranoscopidae

**Astroscopus** sp. -- Kempsville Formation, Princess Anne County (Ray and others, 1968)

Anguillidae

**Anguilla** cf. *A. bostoniensis* -- Bath County (Guilday and others, 1977)

Esocidae

**Esox** cf. *E. americanus* or *E. niger* -- Bath County (Guilday and others, 1977)

Cyprinidae

**Semotilus** cf. *S. corporalis* (Mitchill) -- Bath County (Guilday and others, 1977)

**Nocomis** cf. *N. raneyi* -- Bath County (Guilday and others, 1977)

gen. et sp. indet. -- Augusta County (Guilday, 1962b)

Catostomidae

**Catostomus** sp. -- Bath County (Guilday and others, 1977)

**Moxostoma** sp. -- Bath County (Guilday and others, 1977)

gen. et sp. indet. -- Augusta County (Guilday, 1962b); Smyth County (McDonald and Bartlett, 1982)
Ictaluridae

*Noturus* sp. -- Bath County (Guilday and others, 1977)

Amphibia

Urodela

Cryptobranchidae

*Cryptobranchus alleganiensis* (Daudin 1803) -- Smyth County (Holman and McDonald, 1986; Holman, 1986)

*Cryptobranchus* sp. -- Wythe County (Guilday, 1962a; Cope, 1869a)

Salamandridae

*Notophthalmus viridescens* Rafinesque 1820 -- Augusta County (Fay, 1984; Guilday, 1962b; Holman, 1986), Bath County (Fay, 1984; Guilday and others, 1977; Holman, 1986), Smyth County (Holman and McDonald, 1986; Holman, 1986)

Ambystomidae

*Ambystoma* (maculatum group) -- Bath County (Fay, 1984; Guilday and others, 1977; Holman, 1986)

*Ambystoma* (maculatum group, *A. jeffersonianum* or *A. maculatum*) -- Augusta County (Fay, 1984; Guilday, 1962b; Holman, 1986)

*Ambystoma* opacum (Gravenhorst 1807) -- Bath County (Holman, 1986)
**Ambystoma tigrinum** (Green 1825) -- Augusta County (Fay, 1984; Guilday, 1962b; Holman, 1986)

**Plethodontidae**

**Desmognathus** sp. -- Augusta County (Fay, 1984; Guilday, 1962b; Holman, 1986), Bath County (Fay, 1984; Guilday and others, 1977; Holman, 1986)

**Gyrinophilus porphyriticus** (Green 1827) -- Bath County (Fay, 1984; Guilday and others, 1977; Holman, 1986)

**Plethodontini** sp. -- Augusta County (Holman, 1986), Bath County (Holman, 1986)

**Pseudotriton** sp. -- Bath County (Fay, 1984; Guilday and others, 1977; Holman, 1986)

**Anura**

**Pelobatidae**

**Scaphiopus holbrooki** (Harlan 1835) -- Augusta County (Fay, 1984; Guilday, 1962b; Holman, 1986), Bath County (Fay, 1984; Guilday and others, 1977; Holman, 1986)

**Bufonidae**

**Bufo americanus** Holbrook 1836 -- Augusta County (Fay, 1984; Guilday, 1962b; Holman, 1986), Bath County (Fay, 1984; Guilday and others, 1977; Holman, 1986)

**Bufo woodhousei fowleri** Hinckley 1882 -- Augusta County (Fay, 1984; Guilday, 1962b; Holman, 1986), Bath County (Fay, 1984; Guilday and others, 1977; Holman, 1986), Smyth County (Holman and McDonald, 1986; Holman, 1986)
Hylidae

*Hyla chrysoscelis* or *H. versicolor* -- Augusta County (Fay, 1984; Guilday, 1962b; Holman, 1986)

*Pseudacris crucifer* (Neuwied 1838) -- Bath County (Fay, 1984; Guilday and others, 1977; Holman, 1986)

Ranidae

*Rana catesbeiana* Shaw 1802 -- Augusta County (Fay, 1984; Guilday, 1962b; Holman, 1986), Bath County (Fay, 1984; Guilday and others, 1977; Holman, 1986)

*Rana clamitans* Latreille 1801 -- Augusta County (Fay, 1984; Guilday, 1962b; Holman, 1986), Bath County (Fay, 1984; Guilday and others, 1977; Holman, 1986)

*Rana palustris* Le Conte 1825 -- Augusta County (Fay, 1984; Guilday, 1962b; Holman, 1986); Bath County (Fay, 1984; Guilday and others, 1977; Holman, 1986)

*Rana cf. Rana pipiens* -- Augusta County (Fay, 1984; Guilday, 1962b; Holman, 1986), Bath County (Fay, 1984; Guilday and others, 1977; Holman, 1986), Smyth County (Holman and McDonald, 1986; Holman, 1986)

*Rana sylvatica* Le Conte 1825 -- Augusta County (Fay, 1984; Guilday, 1962b; Holman, 1986), Bath County (Fay, 1984; Guilday and others, 1977; Holman, 1986)
Reptilia
Chelonia
Chelydridae

Chelydra serpentina (Linnaeus 1758) -- Augusta County
(Fay, 1984; Guilday, 1962b; Holman, 1986), Smyth County
(Holman and McDonald, 1986; Holman, 1986)

Emydidae

Graptemys geographica (LeSueur 1817) -- Bath County
(Fay, 1984; Guilday and others, 1977; Holman, 1986)

Terrapene carolina (Linnaeus 1758) -- Augusta County
(Fay, 1984; Guilday, 1962b; Holman, 1986)

Terrapene sp. -- Wythe County (Guilday, 1962a; Cope, 1869a)

Chrysemys picta (Schneider 1783) -- Smyth County (Holman and McDonald, 1986; Holman, 1986)

Trionychidae

Trionyx sp. -- Wythe County (Guilday, 1962a; Cope, 1869a)

Lacertilia
Iguanidae

Sceloporus undulatus (Latreille 1801) -- Augusta County
(Fay, 1984; Guilday, 1962b; Holman, 1986), Bath County
(Fay, 1984; Guilday and others, 1977; Holman, 1986)
Scincidae

_Eumeces_ ?laticeps -- Bath County (Fay, 1984; Guilday and others, 1977; Holman, 1986)

_Scincella lateralis_ (Say 1823) -- Augusta County (Fay, 1984; Guilday, 1962b; Holman, 1986)

Serpentes

Colubridae

_Nerodia erythrogaster_ (Forster 1771) -- Augusta County (Fay, 1984; Guilday, 1962b; Holman, 1986)

_Nerodia sipedon_ (Linnaeus 1758) -- Augusta County (Fay, 1984; Guilday, 1962b; Holman, 1986), Bath County (Fay, 1984; Guilday and others, 1977; Holman, 1986), Smyth County (Holman and McDonald, 1986; Holman, 1986)

_?Regina septemvittata_ (Say 1825) -- Bath County (Fay, 1984; Guilday and others, 1977; Holman, 1986)

_Storeria dekayi_ (Holbrook 1839) -- Bath County (Fay, 1984; Guilday and others, 1977; Holman, 1986)

_Storeria occipitomaculata_ (Storer 1839) -- Augusta County (Fay, 1984; Guilday, 1962b; Holman, 1986), Bath County (Fay, 1984; Guilday and others, 1977; Holman, 1986)

_Thanamphis sauritus_ (Linnaeus 1766) -- Augusta County (Fay, 1984; Guilday, 1962b; Holman, 1986), Bath County (Fay, 1984; Guilday and others, 1977; Holman, 1986)

_Thanamphis sirtalis_ (Linnaeus 1758) -- Augusta County (Fay, 1984; Guilday, 1962b; Holman, 1986), Bath County
Virginia valeriae (Baird and Girard 1853) -- Bath County
(Fay, 1984; Guilday and others, 1977; Holman, 1986)

Virginia sp. -- Augusta County (Fay, 1984; Guilday, 1962b; not reaffirmed in Holman, 1986)

Carphophis amoenus (Say 1825) -- Augusta County (Fay, 1984; Guilday, 1962b; Holman, 1986), Bath County (Fay, 1984; Guilday and others, 1977; Holman, 1986)

Diadophis punctatus (Linnaeus 1766) -- Augusta County (Fay, 1984; Guilday, 1962b; Holman, 1986), Bath County (Fay, 1984; Guilday and others, 1977; Holman, 1986)

Heterodon platyrhinos Latreille 1801 -- Bath County
(Fay, 1984; Guilday and others, 1977; Holman, 1986)

?Tantilla coronata Baird & Girard 1853 -- Bath County
(Fay, 1984; Guilday and others, 1977; Holman, 1986)

Coluber or Masticophis sp. -- Augusta County (Fay, 1984; Guilday, 1962b; Holman, 1986), Bath County (Fay, 1984; Guilday and others, 1977; Holman, 1986)

Opheodrys aestivus (Linnaeus 1766) -- Bath County (Fay, 1984; Guilday and others, 1977; Holman, 1986)

Opheodrys vernalis (Harlan 1827) -- Augusta County (Fay, 1984; Guilday, 1962b; not reaffirmed in Holman, 1986), Bath County (Fay, 1984; Guilday and others, 1977; Holman, 1986)

Cemophora coccinea (Blumenbach 1788) -- Bath County
(Fay, 1984; Guilday and others, 1977; Holman, 1986)
Elaphe guttata (Linnaeus 1766) -- Augusta County (Fay, 1984; Guilday, 1962b; Holman, 1986), Bath County (Fay, 1984; Guilday and others, 1977; Holman, 1986)

Elaphe obsoleta (Say 1823) -- Augusta County (Fay, 1984; Guilday, 1962b; Holman, 1986), Bath County (Fay, 1984; Guilday and others, 1977; Holman, 1986), Smyth County (Holman and McDonald, 1986; Holman, 1986)

Lampropeltis getula Linnaeus 1766 -- Augusta County (Fay, 1984; Guilday, 1962b; Holman, 1986), Bath County (Fay, 1984; Guilday and others, 1977; Holman, 1986)

Lampropeltis calligaster (Harlan 1827) -- Bath County (Fay, 1984; Guilday and others, 1977; Holman, 1986)

Lampropeltis triangulum (Lacepede 1788) -- Augusta County (Fay, 1984; Guilday, 1962b; Holman, 1986), Bath County (Fay, 1984; Guilday and others, 1977; Holman, 1986)

Crotalidae

Crotalus horridus Linnaeus 1758 -- Augusta County (Fay, 1984; Guilday, 1962b; Holman, 1986), Bath County (Fay, 1984; Guilday and others, 1977; Holman, 1986)
Holocene

Amphibia

Urodela
Cryptobranchidae

**Cryptobranchus alleganiensis** (Daudin 1803), -- Giles County (Weems and Higgins, 1977)

Anura
Bufonidae

**Bufo woodhousii fowleri** -- Giles County (Weems and Higgins, 1977)

Reptilia
Serpentes
Colubridae

isolated vertebrae -- Giles County (Weems and Higgins, 1977)

Crotalidae

**Crotalus horridus** Linnaeus 1758 -- Giles County (Weems and Higgins, 1977)
Literature cited


Clark, W.B., 1895, Contributions to the Eocene fauna of the Middle Atlantic Slope: Johns Hopkins University Circular, vol. 15, p. 3-6.


Cope, E.D., 1869a, Synopsis of the extinct mammalia of the cave formations in the United States, with observations on some Myriapoda found in and near the same, and on some extinct mammals of the caves of Anguilla, W.I., and of other localities: Proceedings of the Academy of Natural Sciences of Philadelphia, vol. 21, p. 171-192, plates 3-5.


Holman, J.A., 1986, The known herpetofauna of the late Quaternary of Virginia poses a dilemma in J.N. McDonald and S.O. Bird (editors) The Quaternary of Virginia--a symposium volume: Virginia Division of Mineral Resources publication 75, p. 36-42


Hutchison, Howard, and Weems, R.E., 1991, Paleocene turtles from South Carolina: Charleston Museum Special Publication (in


Leidy, Joseph, 1873a, Notice of fossil vertebrates from the Miocene of Virginia: Proceedings of th Academy of Natural Sciences of Philadelphia, p. 15


Litwin, R.J., and Weems, R.E., 199_, Parasuchipus harrisi (gen. et sp. nov.) - first definitive fossil tracks for Late Triassic parasuchian archosaurs (phytosaurs): (in review)


Pannel, N.K., 1985, Dinosaur footprints at Oak Hill, Virginia: M.S. thesis, Department of Geology, the George Washington University, Washington, D.C.


Ward, D.J., and Wiest, R.L., Jr., 1990, A checklist of Palaeocene and Eocene sharks and rays (Chondrichthyes) from the
Pamunkey Group, Maryland and Virginia, USA: Tertiary Research, vol. 12, no. 2, p. 81-88.


Weems, R.E., 1974b, New occurrences of some fossil fishes described by Cope and Leidy from the Miocene of Virginia and Maryland: Virginia Journal of Science, vol. 25, p. 95.


Weems, R.E., 199_, Teleost fish remains from the Paleocene of South Carolina: Charleston Museum Special Publication (in press)


Acknowledgements

I would like to gratefully acknowledge the careful reviews of the manuscript of this open-file report by Joseph C. Mitchell for reptiles and amphibians (University of Richmond) and Robert P. Purdy for fishes (U.S. National Museum). The final product was greatly improved by the efforts of both. I would also like to thank Michael K. Brett-Surman (U.S. National Museum) for making available a listing of the reptilian remains which are reposited in the U.S. National Museum.