GEOLOGY AND PALEONTOLOGY OF THE BUREAU OF LAND MANAGEMENT DOUGLAS POINT SPECIAL RECREATION MANAGEMENT AREA

CHARLES COUNTY, MARYLAND

December 2008

Lower Potomac Field Station
Eastern States

BLM

GEOLOGY AND PALEONTOLOGY OF THE BUREAU OF LAND MANAGEMENT DOUGLAS POINT SPECIAL RECREATION MANAGEMENT AREA, CHARLES COUNTY, MARYLAND

INTRODUCTION

The Bureau of Land Management's (BLM's) Douglas Point Special Recreation Management Area (SRMA) is located on the east side of the Potomac River in southwestern Charles County, MD. Douglas Point SRMA is part of the Nanjemoy Natural Resource Management Area (NRMA) which is jointly managed by the BLM and the Maryland Department of Natural Resources (MDNR). The area is accessible via the Potomac Heritage Trail that is about one mile south of the junction of Liverpool Point Road and Maryland State Route 224. The SRMA is open to hiking, wildlife observation, fishing, and beachcombing – which includes fossil collecting on the State of Maryland-owned beaches. The SRMA and vicinity was host to human occupation over thousands of years, and BLM has interpreted the historic Chiles Home Site in an area of colonial settlement that began in the 1650's. Today, the beach along this part of the Potomac River is a popular fossil shark teeth collecting area amongst amateur collectors. This report is a description of the geology and paleontology of the Douglas Point SRMA along the banks of the Potomac River with some recommendations for management of the paleontological resources.

METHODOLOGY

A literature search using the Internet was conducted and field visits were made to the site to verify the geology and paleontology of the area. Lists of taxa found in the literature and on the Internet are compiled in the appendices. Literature and Internet references used for this report are found in the reference section.

ACKNOWLEDGEMENTS

Special thanks to Mike Folmer and Chuck Ball, amateur paleontologists from Maryland, for their help and assistance with the field reconnaissance of the Douglas Point SRMA. Special recognition and appreciation is given for the preparation of display cases of representative fossils found in the Douglas Point and Liverpool Point areas for BLM's environmental education program. Special thanks also goes to Dr. Robert E. Weems, paleontologist with the U.S. Geological Survey for his help in identifying fossil specimens collected from the Douglas Point SRMA. This report was prepared by Lucia Kuizon, National Paleontologist, Bureau of Land Management, Washington, DC. This manuscript was updated on February 24, 2009.

GEOLOGIC SETTING

Charles County, MD, is located within the Atlantic Coastal Plain Physiographic Province. Study of the geology of the Atlantic Coastal Plain and its Tertiary-age geologic formations began in the mid-1700's (1901, Clark and Martin, p. 24.) Many geologic and paleontologic studies based on continuing research were written throughout the 19th and 20th Centuries, especially the

paleontological work of T.A. Conrad with the Philadelphia National Academy of Sciences and the geologic and paleontologic work of William Bullock Clark with the U.S. Geological Survey and later with the Maryland Geological Survey. Sir Charles Lyell, one of the founding fathers of geology, also wrote about the geology of Maryland and the Tertiary deposits of the Mid-Atlantic Coast in the 1840's (Lyell's Travels in North America: 1841-1842, vol. 1, 1845). More recently, the geology of the Potomac River and vicinity has been extensively studied by geologists and paleontologists of the U.S. Geological Survey (USGS), the Maryland Geological Survey, the Virginia Division of Mineral Resources, and the National Museum of Natural History.

The Atlantic Coastal Plain Physiographic Province is characterized by unconsolidated sedimentary rocks of sand, silt, and clay eroded from mountains that once existed to the west in the Piedmont Plateau Physiographic Province, and then were deposited along the continental shelf (see Figure 1). These sedimentary units were laid down during a period of transgressions and regressions of the Atlantic Ocean over millions of years (Cretaceous to Quaternary) in an area known as the Salisbury Embayment, a tectonic basin that was part of a series of basins and arches (down warps and uplifts) along the Atlantic Coast of the United States. (Ward and Powars, 2004, p. 265-272). The Atlantic Coastal Plain is further subdivided into sub-provinces, Douglas Point SMRA being in the Western Shore Uplands Region west of the Chesapeake Bay. The Western Shore Uplands is characterized by more relief, i.e., it is slightly hillier with higher elevations than the area east of the Chesapeake Bay (Schimdt, 1993, pp. 3-6.)

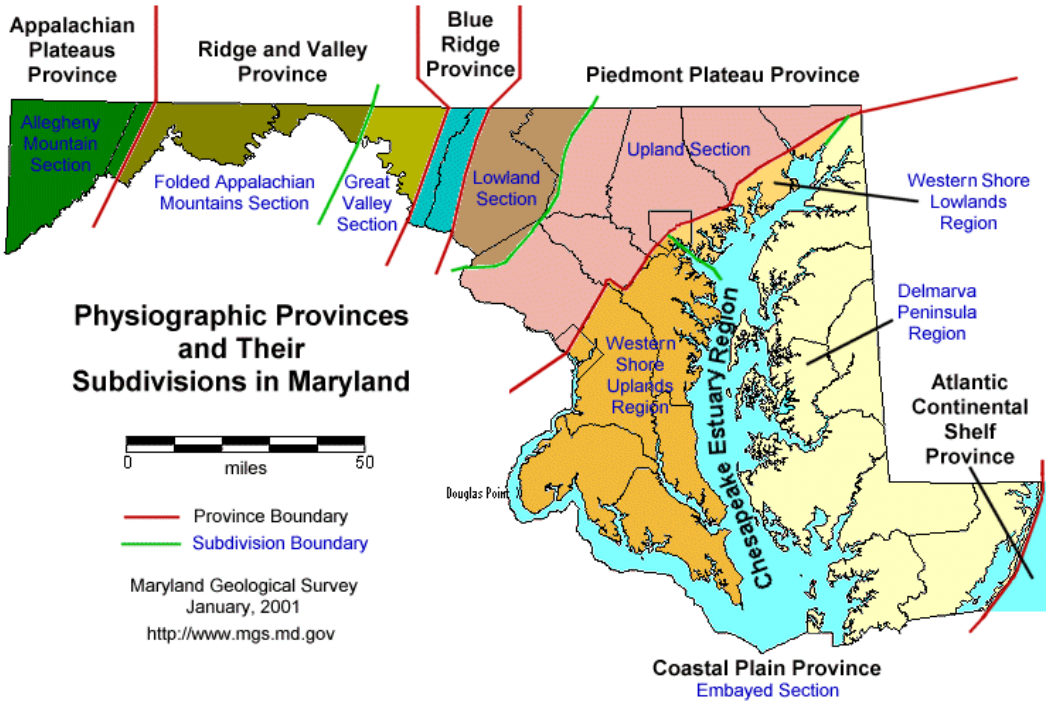


Figure 1. Physiographic Provinces in Maryland. The Atlantic Coastal Plain Physiographic Province is subdivided into the Western Shore Uplands Region and the Western Shore Lowlands Region. Douglas Point is in the Western Shore Uplands Region (Conkwright, 2001).

ERA	PERIOD	EPOCH	FORMATION	MEMBER	AGE/Sub-age
CENOZOIC	Quaternary	Pleistocene	Undifferentiated		0.0117 To 1.806 Ma
	Tertiary	Pliocene	Not present		
		Miocene	Not present		
		Oligocene	Not present		
		Eocene	Not present		
		Paleocene	Aquia Formation (Late Paleocene)	Paspotansa Member	Thanetian = 58.7 ± 0.2 Ma to 55.8 ± 0.2 Ma Selandian = 58.7 ± 0.2 Ma to ~61.1 Ma
				Piscataway Member	

Figure 2. Geologic Time Scale and Stratigraphy at Douglas Point SMRA, MD (after ICS, 2008).

GEOLOGY

Geologic formations of the Atlantic Coastal Plain exposed at Douglas Point SMRA were deposited during the Tertiary and Quaternary Geologic Time Periods (see Figure 2 and Appendix 2). The geologic units exposed on the surface at Douglas Point SMRA are Quaternary Pleistocene surficial deposits made up predominantly of Potomac River terrace and other alluvial silt, sand and gravel deposits (see Figure 3). The soils that were formed from these deposits host Eastern Woodlands vegetation. The geology of the Atlantic Coastal Plain was also impacted by the last glacial and interglacial periods (glacial cycle) that began about 135,000 years ago (Krantz et al, 2007, in press). Although there was no continental ice that actually extended as far south as Maryland, the rise and fall of sea level during the glacial cycle influenced the deposition of the Quaternary formations. Isostacy – the rise and fall of the continental crust as a result of the weight of glacial ice – impacted the topography by creating incised river channels, especially during isostatic, or post-glacial, rebound when the weight of the ice was removed as it retreated northward.

The Potomac River incised channel exposes the Late Paleocene Aquia Formation along the bluffs at the Douglas Point SMRA (see Figure 4). The Aquia Formation was deposited between 55 and 60 million years ago, about 5 million years after the impact of an asteroid or meteor at the end of the Late Cretaceous that wiped out about 75% of life on Earth including the dinosaurs. The sedimentary rocks of the Aquia Formation were formed in a shallow near-shore marine (neritic) environment over this period of time. They contain a large amount of "greensands," i.e., they contain high concentration of the mineral glauconite – a green phyllosilicate mineral or silicate hydroxide containing potassium, sodium, iron, aluminum, and magnesium. The amount of glauconite contained in a sedimentary unit is directly related to the distance from the original source rock in the Piedmont to the west to the shoreline where the material was deposited as well as the amount of the mineral biotite in the original source rock.

At the base of the cliff and along the beach at Blue Bay between Liverpool Point and Douglas Point, the Aquia Formation is composed mainly of indurated (hard and compact) shelly units of

glauconitic sands and clay (see Photo 1). These shelly units are characteristic of the Piscataway Member of the Aquia Formation and are the source of the majority of the fossils found at Douglas Point SRMA. South of Blue Bay at Douglas Point, a pebble/cobble conglomerate unit crops out along the beach, and marks an erosional contact with the overlying Pleistocene surficial deposits of the Maryland Point Formation (Davis *et al*, 2001). The Paspotansa Member of the Aquia Formation is not exposed on the banks of the Potomac at the Douglas Point SRMA.

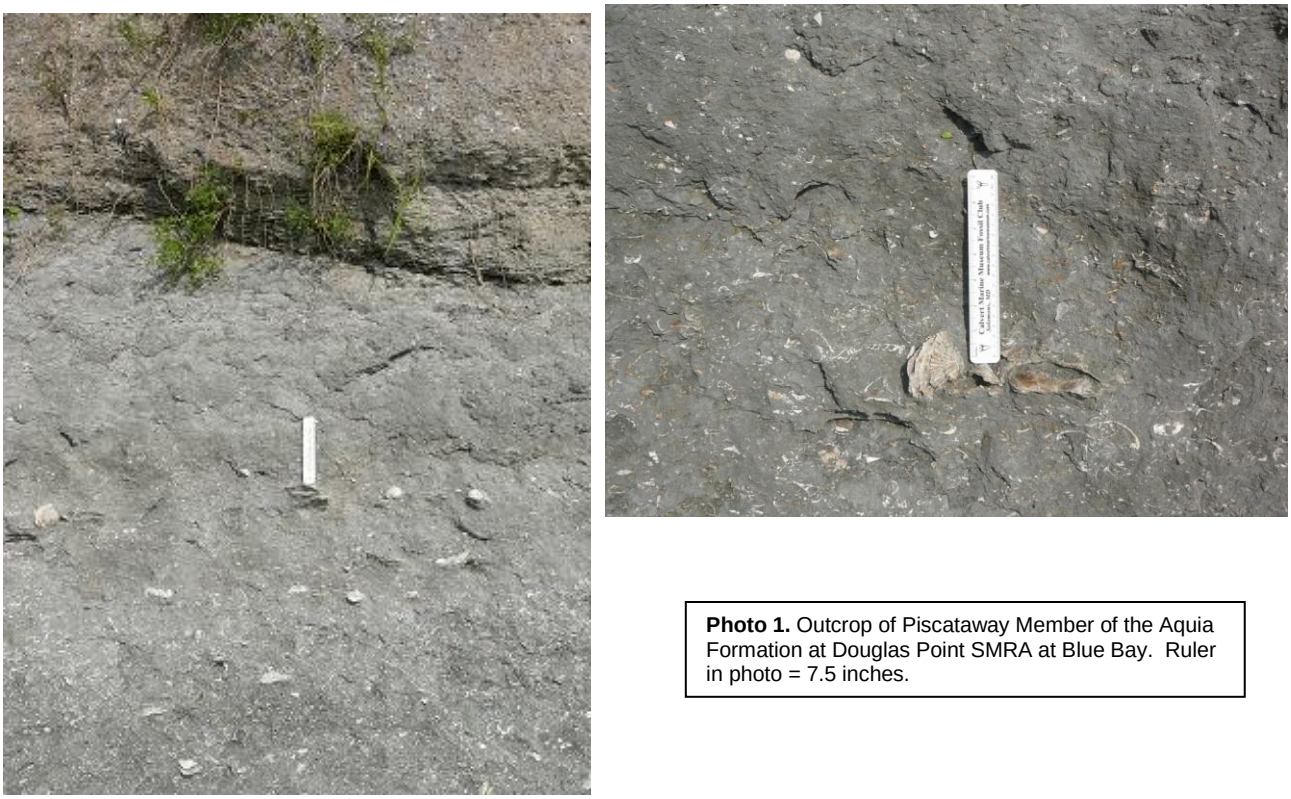


Photo 1. Outcrop of Piscataway Member of the Aquia Formation at Douglas Point SMRA at Blue Bay. Ruler in photo = 7.5 inches.

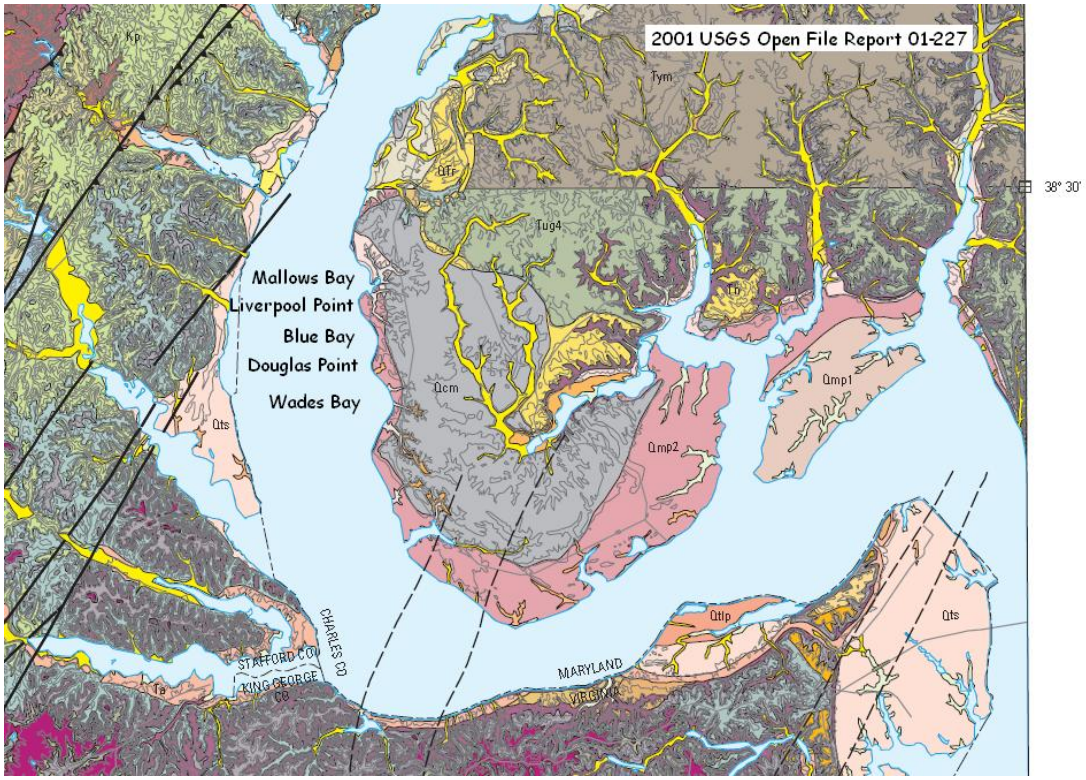


Figure 3. Surficial Geology, Charles County, MD from USGS Open File Report 01-227 (Davis et al, 2001)[1]

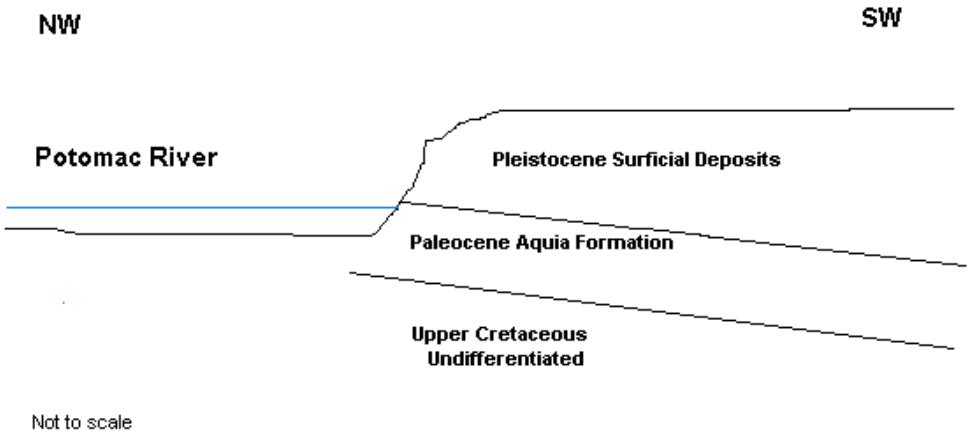


Figure 4. Idealized geologic cross-section at Douglas Point SMRA, Maryland (after Maryland Department of Geology, Mines and Water Resources, 1948).

[1] Explanation of surficial geologic units at Douglas Point SMRA:
Qmp1 – Maryland Point Formation. Fine to medium, poorly to moderately well sorted, light- to dark-gray sand, in part, clayey and silty. Constitutes surficial terrace deposits.
Qmp2 –Maryland Point Formation. Fine to coarse, poorly to well-sorted, gray sand, weathers grayish orange. Contains plant fragments and oyster beds. Unit consists of extensive surficial terrace deposits.
Qcm - Chicamuxen Formation (lower Pleistocene) -- Coarse gravelly sand and clay-silt grades.

PALEONTOLOGICAL SETTING

Maryland has played an important role in the study and lure of paleontology. In 1858, one of the first discoveries of North American dinosaurs was found in Prince Georges County. Two teeth of *Astrodon johnstoni*, a sauropod dinosaur, were discovered in a marl pit in Early Cretaceous-aged clays near Muirkirk in Prince George's County (2004, Maryland Geological Survey). *Astrodon johnstoni* was officially named Maryland's state dinosaur in 1998.

Interest in fossil collecting in Charles County and at the Douglas Point SRMA goes as far back as colonial days as evident from the fossil sharks teeth collected from the Chiles Home Site during archaeological excavations by William and Mary Center for Archaeological Research in 2005. The first comprehensive paleontological research studies of Maryland were by T.A. Conrad with the Philadelphia Academy of Natural Sciences in the 1830's. His work included identifying and naming new species of invertebrate fossils from Clifton Beach, south of the Douglas Point SRMA and Purse State Park.

PALEONTOLOGY

Many fossil species have been identified and studied from the Aquia Formation in Virginia and Maryland by paleontologists and amateur collectors. The type section, or the sequence of rock strata where the Aquia formation was originally described, is near Aquia Harbor in Stafford County, Virginia. The formation was originally thought to be of the Eocene Epoch, but subsequent paleontological research of ancient foraminifera (a single-celled organism belonging to the Order Foraminiferida in the Phylum Protozoa) from the Aquia Formation showed that it was older, and deposited (or formed) during the Late Paleocene (see Figure 2 or Appendix 2). This is a great example of how fossils (called index fossils) are used to date rock formations in geologic time.

The Linnaean System of the Classification of Life (Systematics)[1]

Kingdom
Phylum
Subphylum
Class
Order
Family
Genus
Species

[1] There can be subunits of each level such as Superclass and Subclass.

The diversity of fossils found at the Douglas Point SRMA include invertebrates (organisms without backbones), vertebrates (organisms with backbones), and plants. The types of fossils are predominantly body fossils, or remains of body parts, which may or may not have undergone the process of fossilization. Fossilization is the process whereby the remains – a body part or trace – of an organism, whether plant or animal, were preserved in the Earth's crust. The process usually involves rapid burial after death and replacement of organic matter with inorganic minerals that replicate the remains of the organism.

Some of the typical invertebrate fossils found at Douglas Point SMRA include oysters, clams, giant clams, gastropods, ammonites, and cephalopods. Vertebrate fossils found here include many species of extinct sharks, bony fishes, rays (related to sharks), turtles, crocodiles, mammals, and birds. Plant fossils have also been found particularly pinaceous cones. Body fossils found at the Douglas Point SRMA include whole and partial shells, shell fragments, bones of fish, reptiles, mammals, and birds, otoliths (or inner ear concretions in fish), scutes and costals of turtles, and teeth of sharks, rays, and other fish. In addition to body fossils, trace fossils have also been found including coprolites (or fossilized excrement) of crocodiles and steinkerns (or internal molds) of the gastropod (snail), *Turitella* sp. as well as other mollusks.

Lists of the fossils by taxa, or unit of ranking within the Linnaean Taxonomic Classification System, which have been identified at localities in and around the Douglas Point SRMA, will be found in the Appendices. Localities include Liverpool Point, north of the SRMA, Clifton Beach and Wades Bay, South of Douglas Point and the SRMA, and Blue Bay within the SRMA. The taxa lists only include species found in the Piscataway Member of the Aquia Formation found in Maryland where possible. The Paspotansa Member of the Aquia Formation contains many of the same fossils as well as other distinct fossil taxa that do not occur in the Piscataway.

Taxonomic Classification (Systematics) of *Striatolamia striata* var. *macrota (*?)
Extinct genus of a sand tiger- like shark found at Douglas Point SRMA

Kingdom = Animalia
Phylum = Craniata
Subphylum = Vertebrata
Superclass = Gnathostomata
Class = Chondrichthyes
Subclass = Elasmobranchii
Superorder = Galea
Order = Lamniformes
Family = Odontaspididae (?)
Genus = *Striatolamia*
Species = *striata var. macrota (?)*

(?) indicates ongoing revision in classification of this taxon.

Appendix 3 is a list of taxa identified in the literature. Appendix 4 is a list of taxa identified from the Internet predominantly web pages of amateur collectors. Appendix 5 is a list of taxa identified by Mike Folmer and Chuck Bell, amateur paleontologists/ collectors.

MANAGEMENT CONSIDERATIONS

Paleontological Resources

The 2005 Nanjemoy NRMA Land Unit Implementation Plan (LUIP) contains management goals and recommendations for paleontological resources as well as a site analysis that identifies the opportunities and constraints within these recommendations. Protection of paleontological resources for future generations of the public is the overall management goal for fossil resources in the Douglas Point SRMA. Paleontological resources will be managed for their scientific, educational, and recreational values. The specific management recommendations are reproduced below in Table 1.

In situ paleontological resources at the Douglas Point SRMA occur within the Late Paleocene Aquia Formation exposed along the banks of the Potomac River. Fossils below the mean high water level belong to the State of Maryland; fossil about the mean high water mark on the property of the BLM. Fossil remains contained within the banks of the Potomac River at Douglas Point are scientifically significant because they (1) are found in stratigraphic context within the Aquia Formation; (2) represent life on Earth 60 million years ago in the Late Paleocene; and (3) record the history of life after the meteor impact event that occurred 65 million years ago at the end of the Late Cretaceous Period. Collecting of vertebrate paleontological resources from the cliff face is only allowed for scientific purposes, and requires a permit from the appropriate agency. However, the incised banks of the Potomac River are being continuously eroded by water, wind, and tree-fall, and therefore, release fossil remains onto the beaches along the cliffs. These fossils generally lose their scientific value because they no longer have stratigraphic context. Therefore, sharks teeth, shells, and other fragmentary fossil remains found lying along the beach may be collected and taken home. Fossil collecting has long been a traditional recreational use of the Blue Banks area, Liverpool Point, Purse State Park, and Clifton Beach. However, some of these eroded fossil remains may retain some scientific value if they represent (a) a rare taxon, (b) a taxon never before found at this locality, or (c) a species with a unique morphological feature never observed in other specimens. This issue was not identified in the Nanjemoy NRMA LUIP. The recommendation to mitigate this issue would be to educate the local amateur collectors and encourage then to contact a paleontologist at the National Museum of Natural History, the Calvert Marine Museum, or the U.S. Geological Survey when they find an unusual fossil specimen. Another issue not identified in the LUIP is the association of fossil remains found in historic context with the Chiles Homesite and other historic sites in the Douglas Point SRMA, as well as in association with Paleo-Indian sites. Recommendations for mitigation would be to educate researchers at Douglas Point SRMA about the association of fossil remains with historic or Paleo-Indian sites, and to follow MR 30 and 31 for Cultural Resources.

Recreational Opportunities

Take it Outside! Program

The Bureau of Land Management's (BLM's) "Take It Outside" program promotes and supports outdoor activities and experiences of children on the public lands. The program strives to

improve the health of our nation's children, families, and communities, while at the same time developing the next generation of public land stewards.

The Douglas Point SRMA would be an ideal location for this program. The SRMA is particularly ideal because it offers the opportunity for inner city kids in the Washington, DC metropolitan area to experience what it means to be away from all the concrete, traffic, and people. Inner city kids would be able to experience and enjoy hiking, beachcombing, and fossil collecting.

Educational Opportunities

Educating children in outdoor settings is a proven technique for improving student test scores and motivation; enhancing understanding of natural processes; and promoting attitudes of respect and responsibility. Curricula, educational talks, and brochures can be developed about (a) the importance of paleontological resources, (b) introductory geology and other earth processes at the SRMA, and (c) appropriate fossil collecting do's and don'ts.

Another program that encourage kids to experience nature and learn about the environment is the "No Child Inside" Program. The emphasis of this program is developing curricula for grades K-12 focused on environmental education including climate change. A fascinating curriculum could be developed around the asteroid/meteor impact event that wiped out the dinosaurs and 75% of life on Earth as a result. The Aquia Formation at Douglas Point was deposited about 5 million years after the impact. It also represents what life was like on Earth prior to another global warming and extinction event that occurred at the Paleocene-Eocene boundary that is currently being studied by scientists world-wide – the Paleocene-Eocene Thermal Maximum (PETM).

Safety Issues

1. **Cliff Instability.** The geologic formations exposed along the incised banks of the Potomac River are unconsolidated sediments. Therefore, they are extremely unstable when in vertical or almost vertical angles. In addition to the scientific issue, fossil collecting from the cliff face must be prohibited unless conducted by qualified scientists because of the potential for slope failure. Slope failure may also cause the trees along the cliff edge to become uprooted and fall down.

2. **Tides.** The Potomac River is an estuary, and therefore, the water levels are influenced by the orbit of the Moon, i.e., the tides. The beach at Douglas Point SRMA is submerged during high tides, and therefore, not appropriate for beachcombing and fossil collecting. Higher water levels that submerge the beach may also occur during periods of high winds, such as during severe thunderstorms, hurricanes, and tornadoes.

3. **Errant Winds.** The incised nature of the Potomac River intensifies the winds that travel down the river channel and may create microbursts and may cause trees at the edge of the cliff face to blow down. Blow downs may also occur during severe thunderstorms and tornados.

Table 1. Paleontological Resources Management Recommendations for the Douglas Point SRMA (2005, Nanjemoy NRMA Land Unit Implementation Plan)

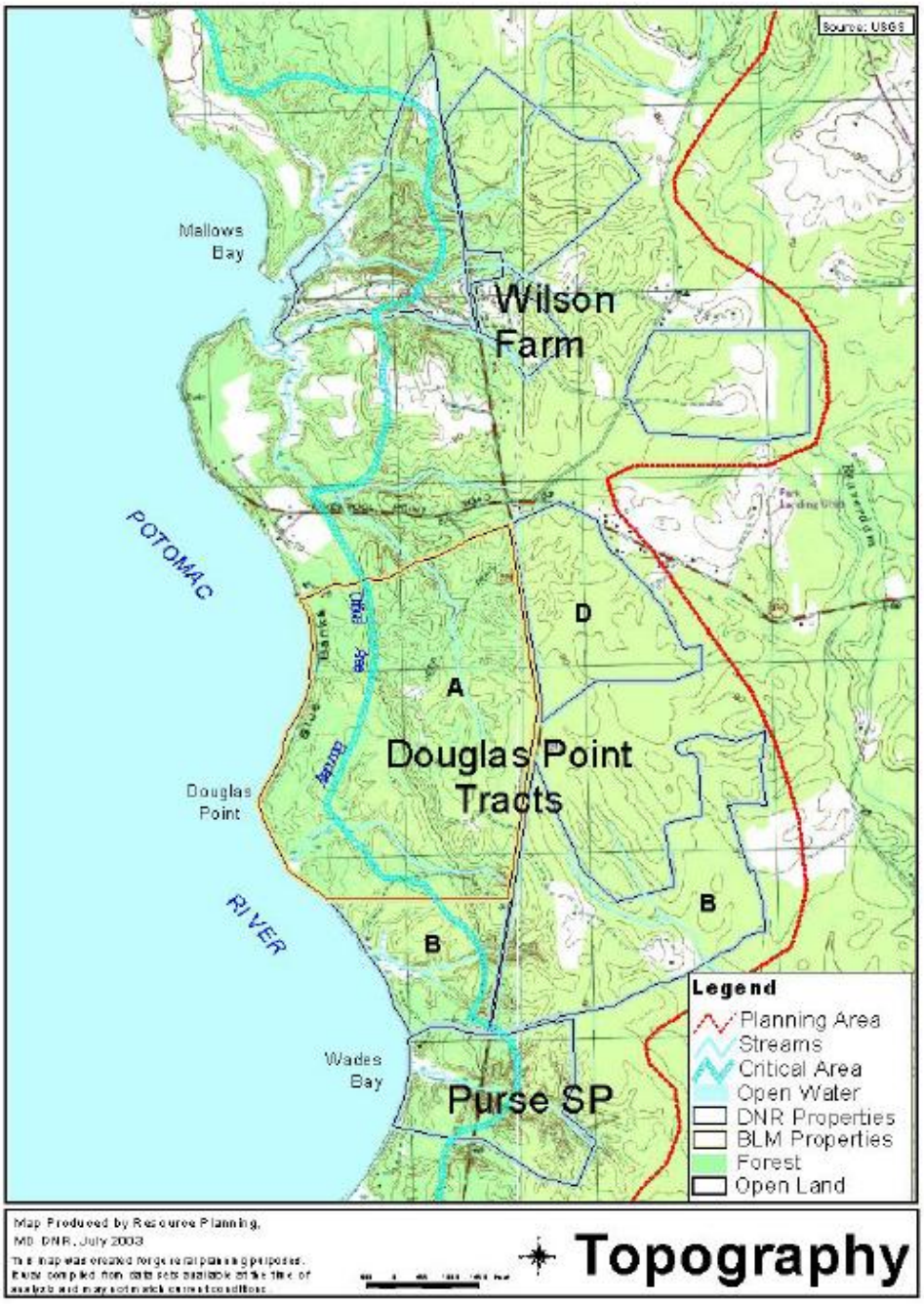
MR No.	Recommendation	Analysis
36	Protect fossils of significance by prohibiting the collection of any fossils still embedded in the exposed cliffs along the shoreline. Exceptions will be made (i.e. professional collectors working for public institutions) for those who have acquired permits issued by the BLM and MDNR. These fossils are important for research and educational purposes and should be placed in museums or other public institutions. Any park visitor finding embedded fossils should (1) leave the fossils in place, and (2) immediately bring it to the attention of the managing agency. However, sharks teeth, shells, and other fragmentary fossils found lying along the beach may be collected and taken home.	*In situ* deposits of paleontological resources are scientifically significant because they are (a) found in place in stratigraphic context within the Aquia Formation, (b) represent life on Earth in the Late Paleocene, and (c) record the history of the recovery of life after the meteor impact event that took place 65 million years ago in the Late Cretaceous. Therefore, these fossils and other paleontological remains located within the cliff faces (i.e. primary context) are protected by State and Federal law. These remains are not open to collection, disturbance or removal, without prior permission from the BLM and MDNR. Ongoing erosion of the cliff face of the Blue Banks release fossil remains onto the beach. Once these fossils are no longer in situ, they lose their stratigraphic context. Therefore, sharks teeth, shells, and other fragmentary fossil remains found lying along the beach may be collected and taken home. This is compatible with the history of the Blue Banks area as a popular place for beachcombing and collecting fossil remains. **Issue not identified in LUIP:** Fossil remains no longer *in situ* may still have some scientific value if they represent a rare taxon or exhibit a morphological feature never before observed in other specimens of the same species. **Recommendation:** Educate amateur collectors about the potential scientific significance of vertebrate fossil finds and recommend that they contact a paleontologist at the National Museum of Natural History, the Calvert Marine Museum, or the U.S. Geological Survey to determine if they have a significant find.
37	Paleontological work in the Douglas Point SRMA must follow the BLM policy for Paleontological Resources.	See Appendix 2, p.2-1 of the Coordinated Management Plan for the Federal Paleontology Program Policy.

38	Conduct a paleontological survey to identify any fossil resources that could be impacted in construction of the Blue Banks Beach trail to the Potomac River, and development of the picnic site on the bluff at Blue Banks Beach.	A field reconnaissance of the Douglas Point tract for this geology and paleontology report reveals that the surficial geologic deposits are Pleistocene or younger in age, and are non-fossil bearing. The Late Paleocene Aquia Formation dips 10 to 15 degrees to the east and is therefore only exposed along the banks of the Potomac River. **Issue not Identified in LUIP:** Sharks teeth and other fossil remains found in context with the historic and archaeological sites within the SRMA are considered cultural resources protected under the National Historic Preservation Act and/or the Archaeological Resources Protection Act. **Recommendations:** Follow MR 31 for fossils found in context with historic or archaeological sites. Educate researchers to expect this association with sites in the area. Any construction or earth-moving activities at the Douglas Point SRMA should contain the standard stipulation language to protect cultural and paleontological resources as identified in MR 30.
39	The BLM, MDNR, and County will ensure that fossils are collected by professionals and placed in permanent, public institutional collections (e.g. Calvert Marine Museum, Smithsonian Institute, or within future Charles County Interpretive Center(s), etc.).	Curation of paleontological resources in a qualified repository is one of the requirements for a federal paleontological resources use permit. See Appendix 2, p.2-1 of the Coordinated Management Plan for the Federal Paleontology Program Policy.

Figure 5. Poster showing recreational opportunities at the BLM Douglas Point SRMA.

Appendix 1. Topographic Map with Administrative Boundaries, Douglas Point SRMA.

Map 7. Topography of Douglas Point and Vicinity



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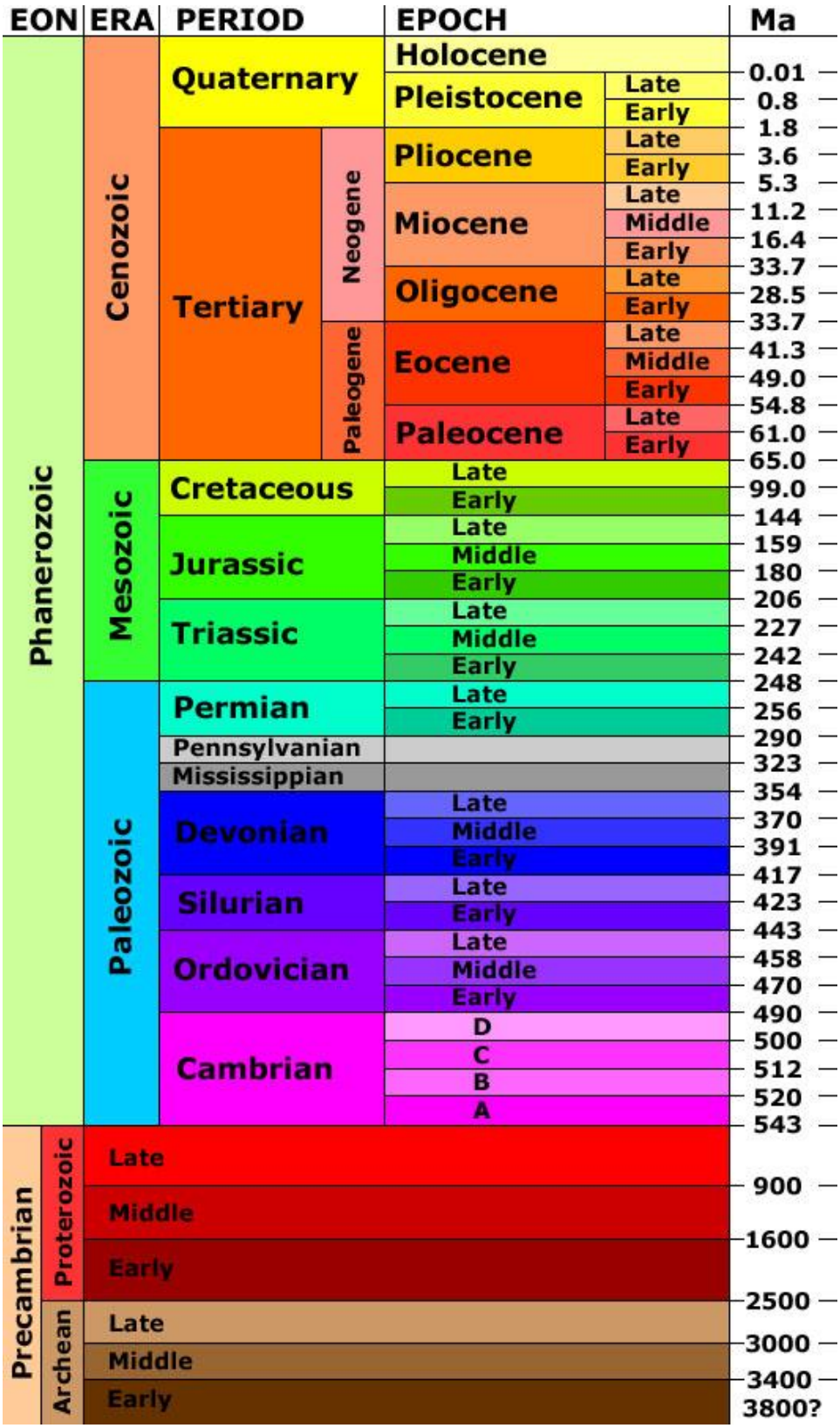
Appendix 2 – Geologic Time Scale from Stoffer, 2006.



APPENDIX 3. Taxa from the Literature

Table 1. Invertebrate Fossils

GENUS - SPECIES	LOCATION	PHYLUM	CLASS	REFERENCE
Hercoglossa tuomeyi	Clifton Beach (CB)	Mollusca	Cephlapoda	1901, Clark & Martin
Nautilus sp.	Clifton Beach	Mollusca	Cephlapoda	1896, Clark, USGS Bull 141
Cyclichna venusta	Clifton Beach	Mollusca	Gastropoda	1901, Clark & Martin
Caricella pyruloides ?	Liverpool Point (LP)	Mollusca	Gastropoda	1901, Clark & Martin
Strepsidura subscalarina	Liverpool Point	Mollusca	Gastropoda	1901, Clark & Martin
Tudicla sp.	Clifton Beach	Mollusca	Gastropoda	1901, Clark & Martin
Turritella mortoni	CB, LP	Mollusca	Gastropoda	1901, Clark & Martin; 1939, Bowles
Turritella humerosa	CB, LP	Mollusca	Gastropoda	1901, Clark & Martin
Natica cliftonensis	Clifton Beach	Mollusca	Gastropoda	1896, Clark; 1901, Clark & Martin
Lunatia marylandica	Liverpool Point	Mollusca	Gastropoda	1901, Clark & Martin
Calyptraea aperta	CB, LP	Mollusca	Gastropoda	1901, Clark & Martin
Calyptraea trochiformis	Clifton Beach	Mollusca	Gastropoda	1896, Clark, USGS Bull 141
Cadulus abruptus	CB, LP	Mollusca	Scaphopoda	1901, Clark & Martin
Teredo virginiana	Clifton Beach	Mollusca	Bivalvia	1896, Clark; 1901, Clark & Martin
Phenacomya petrosa	Clifton Beach	Mollusca	Bivalvia	1901, Clark & Martin
Panopea elongata	Clifton Beach	Mollusca	Bivalvia	1901, Clark & Martin
Corbula subengonata	Clifton Beach	Mollusca	Bivalvia	1901, Clark & Martin
Corbula aldrichi	CB, LP	Mollusca	Bivalvia	1901, Clark & Martin
Tellina (Angelus) virginiana	Clifton Beach	Mollusca	Bivalvia	1901, Clark & Martin
Meretrix ovata var. pyga	CB, LP, Blue Bay (BB)	Mollusca	Bivalvia	1901, Clark & Martin; 1948, Dryden et al
Dosiniopsis lenticularis	CB, LP	Mollusca	Bivalvia	1896, Clark; 1901, Clark & Martin
Lucina uhleri	CB, LP	Mollusca	Bivalvia	1901, Clark & Martin
Crassatellites alaeformis	CB, LP, Wades Bay (WB)	Mollusca	Bivalvia	1896, Clark; 1901, Clark & Martin
Crassatellites aquiana	Liverpool Point	Mollusca	Bivalvia	1901, Clark & Martin
Crassatellites sp.	Clifton Beach	Mollusca	Bivalvia	1901, Clark & Martin
Pholadomya marylandica	Clifton Beach	Mollusca	Bivalvia	1901, Clark & Martin
Modiolus alabamensis	CB, LP, WB	Mollusca	Bivalvia	1901, Clark & Martin
Lithophaga marylandica	Clifton Beach	Mollusca	Bivalvia	1901, Clark & Martin
Anomia marylandica	Clifton Beach	Mollusca	Bivalvia	1901, Clark & Martin
Ostrea compressirostra	LP, WB, CB, BB	Mollusca	Bivalvia	1896, Clark; 1901, Clark & Martin; 1948, Dryden et al
Gryphaea vesicularis	Clifton Beach	Mollusca	Bivalvia	1901, Clark & Martin
Cucullea gigantea	CB, LP, WB	Mollusca	Bivalvia	1901, Clark & Martin
Leda cultelliformes	Clifton Beach	Mollusca	Bivalvia	1901, Clark & Martin
Leda cliftonensis	LP, CB	Mollusca	Bivalvia	1901, Clark & Martin
Cytherea ovata	Clifton Beach	Mollusca	Bivalvia	1896, Clark, USGS Bull 141

GENUS - SPECIES	LOCATION	PHYLUM	CLASS	REFERENCE
Isocardia ?	Wades Bay	Mollusca	Bivalvia	1948, Dryden et al
Venericardia sp.	Wades Bay	Mollusca	Bivalvia	1948, Dryden et al

Naming Conventions

sp. = unidentified or indeterminate taxa
? or cf. = uncertain taxa
var. = multiple varieties

Some common names for the above taxa:

Cucullea gigantea = giant clam
Ostrea compressirostra = oyster
Turritella mortoni = sea snail, gastropod
Hercoglossa tuomeyi = squid-like mollusk with curled shell similar to a nautilus
Cadulus abruptus = tusk shell mollusk: smooth straight conical shell similar to a tusk
Crassatellites alaeformis = clam

Table 2. Vertebrate Fossils

VERTEBRATE FOSSIL	LOCATION	SUPER ORDER	FAMILY	COMMON NAME	REFERENCE
Thecachampsa sp.	Liverpool Point	Crocodylo-morpha	Crocodilidae now Tomistominae (false gravials)	Crocodile	1901, Clark & Martin; 2004 & 2006, Brochu
Thecachampsa marylandica var. sericondon?	Clifton Beach	Crocodylo-morpha	Crocodilidae	Crocodile	1896, Cark; 1901, Clark & Martin
Thecachampsa sericondon ?	Clifton Beach	Crocodylo-morpha	Crocodilidae	Crocodile	1901, Clark & Martin
Eosuchus minor	Blue Bay	Crocodylo-morpha	Gavialoidea	Longirostrine (long snout) crocodilian	Robert Weems, August 2008, per. Comm.
Thoracosaurus neocesariensis	Blue Bay	Crocodylo-morpha	Gavialoidea	Longirostrine crocodilian	Robert Weems, August 2008, per. Comm.
Coprolites	Clifton Beach	Crocodylo-morpha	Unidentified	Crocodile fossil excrement	1896, Cark; 1901, Clark & Martin
Euclastes ? sp., Lytoloma? sp. now Lytoloma sp.	Clifton Beach	Testudines	Chelonidae	Sea turtle	1896, Clark; 1901, Clark & Martin; 1936, Collins & Lynn
Trionyx virginiana	Aquia - Virginia	Testudines	Trionychidae	Fresh water soft shell turtle	Note: reported by amateur collectors near Liverpool Point

VERTEBRATE FOSSIL	LOCATION	CLASS	ORDER	COMMON NAME	REFERENCE
Myliobates copeanus now dixoni	CB, LP	Chondrichthyes	Rajiformes	Eagle Ray	1901, Clark & Martin; Paleobiology database, accessed Sept 2008.
Synechodis clarkia (Paraorthocodus clarkia? Aka	Liverpool Point	Chondrichthyes	Synchodonti-formes	Bullhead shark	1901, Clark & Martin (aka Easton, 1901); Ward and Wiest, 1990

VERTEBRATE FOSSIL	LOCATION	CLASS	ORDER	COMMON NAME	REFERENCE
Paraorthocodus eocaenus?)					
Odontaspis cuspidata	Liverpool Point	Chondrichthyes	Lamniform	Mackerel shark	1901, Clark & Martin
Odontaspis macrota	Liverpool Point	Chondrichthyes	Lamniform	Mackerel shark	1901, Clark & Martin
Odontaspis elegans	CB, LP	Chondrichthyes	Lamniform	Mackerel shark	1896, Cark; 1901, Clark & Martin
Otodus obliquus	Liverpool Point	Chondrichthyes	Lamniform	Extinct mackerel shark	1901, Clark & Martin; 1990 Ward and Wiest
Sphyrna prisca	Liverpool Point	Chondrichthyes	Carcharhiniform	Hammerhead shark	1901, Clark & Martin
Shark vertebrae	CB, BB	Chondrichthyes	Unknown	Unknown	1901, Clark & Martin
Paraorthocodus clarkii ("Synechodos eocaenus?)	Piscataway – Aquia FM, MD	Chondrichthyes	Synechodonti-formes	Extinct shark	1990, Ward and Wiest
Squalus orpiensis	Piscataway – Aquia FM, MD	Chondrichthyes	Squailformes	Dogfish shark	1990, Ward and Wiest
Squalus minor	Piscataway – Aquia FM, MD	Chondrichthyes	Squailformes	Dogfish shark	1990, Ward and Wiest
Heterodontus lerichei	Piscataway – Aquia FM, MD	Chondrichthyes	Heterodonti-formes	Bullhead shark	1990, Ward and Wiest
Ginglymostema africanum now Delpitoscyllium africanum	Piscataway – Aquia FM, MD	Chondrichthyes	Orectolobiformes	Extinct nurse shark	1990, Ward and Wiest; 2000, 2002, Bourbon (elasmo.com) after 2005, Carpetta and Nolf
Striatolamia macrota	Piscataway – Aquia FM, MD	Chondrichthyes	Lamniformes	Sand tiger shark	1990, Ward and Wiest
Carcharias Hopei now--Hypotodus verticalis	Piscataway – Aquia FM, MD	Chondrichthyes	Lamniformes	Sand tiger shark	1990, Ward and Wiest; 2000, 2002, Bourbon (elasmo.com) after 2005, Carpetta and Nolf
Odontapis winkleri	Piscataway – Aquia FM, MD	Chondrichthyes	Lamniformes	Sand tiger shark	1990, Ward and Wiest
Palaeohypotodus rutoti	Piscataway – Aquia FM, MD	Chondrichthyes	Lamniformes	Sand tiger shark	1990, Ward and Wiest
Lamna lerichei	Piscataway – Aquia FM, MD	Chondrichthyes	Lamniformes	Sand tiger shark	1990, Ward and Wiest
Isurolamna inflata	Piscataway – Aquia FM, MD	Chondrichthyes	Lamniformes	Extinct mackerel shark	1990, Ward and Wiest

VERTEBRATE FOSSIL	LOCATION	CLASS	ORDER	COMMON NAME	REFERENCE
Isurus novus	Piscataway – Aquia FM, MD	Chondrichthyes	Lamniformes	Mackerel shark	1990, Ward and Wiest
Palaeocarcharo-don orientalis	Piscataway – Aquia FM, MD	Chondrichthyes	Lamniformes	Extinct mackerel shark	1990, Ward and Wiest
Paleogaleus vincenti (Daimenes)	Piscataway – Aquia FM, MD	Chondrichthyes	Carcharhini-formes	Leopard shark	1990, Ward and Wiest
Scyliorhinus brivesi	Piscataway – Aquia FM, MD	Chondrichthyes	Carcharhini-formes	Cat shark	1990, Ward and Wiest
Scyliorhinus gilberti	Piscataway – Aquia FM, MD	Chondrichthyes	Carcharhini-formes	Cat shark	1990, Ward and Wiest
Abdounia beaugei	Piscataway – Aquia FM, MD	Chondrichthyes	Carcharhiniform es	Requiem shark	1990, Ward and Wiest
Abdounia sp.	Piscataway – Aquia FM, MD	Chondrichthyes	Carcharhini-formes	Requiem shark	1990, Ward and Wiest
Galeorhinus sp.	Piscataway – Aquia FM, MD	Chondrichthyes	Carcharhini-formes	Tope shark	1990, Ward and Wiest
Coupateria wouters	Piscataway – Aquia FM, MD	Chondrichthyes	Myliobatiformes	Eagle ray	1990, Ward and Wiest
?*Raja* sp.	Piscataway – Aquia FM, MD	Chondrichthyes	Rajiformes	Eagle ray	1990, Ward and Wiest
Myliobatis dixoni (Agassiz)	Piscataway – Aquia FM, MD	Chondrichthyes	Rajiformes	Eagle ray	1990, Ward and Wiest
Myliobatis sp.	Piscataway – Aquia FM, MD	Chondrichthyes	Rajiformes	Eagle ray	1990, Ward and Wiest
Coprolites	Clifton Beach	Unknown	Unknown	Fossil fish excrement	1896, Cark; 1901, Clark & Martin
Xiphias ? Radiata	Clifton Beach	Osteichthyes	Perciformes ?	Sword-fish	1901, Clark & Martin
Abulidae indet. -- - now Paralbula marylandica	Liverpool Point	Osteichthyes	Teleostei Albulidae (F) -- now Phyllodontidae	Bony Fish	1936, Myers; 1940, Blake; 1969, Estes
Ischyrhiza (?) radiata Leidy - now Actinopterygian fish indet.	Clifton Beach	Osteichthyes	Unknown	Ray-finned fish	1896, Clark; 2004, Suarez & Cappetta

VERTEBRATE FOSSIL	LOCATION	CLASS	ORDER	COMMON NAME	REFERENCE
Otoliths	Clifton Beach	Osteichthyes	Unknown	Unknown	1896, Clark
Lepisosteus sp.	Aquia FM, MD	Osteichthyes	Lepisosteiformes	Gar fish	1998, Weems
Pycnodus sp.	Aquia FM, MD	Osteichthyes	Pyncnodonti-formes	Extinct ray-finned fish	1998, Weems

?Phencodus s.p	Douglas Point	Mammalia	Condylartha	Ungulate = hoofed	2000, Rose
Arctocyonidae indet.	Douglas Point	Mammalia	Condylartha	Ungulate = hoofed	2000, Rose
Ectoganus cf. gliriformis	Douglas Point	Mammalia	Cimolesta	Suborder Taeniodonta	2000, Rose
Presbyornis isoni	LP, BB	**Infraclass** Aves	Anseriformes	giant duck-like bird	1994, Olson; 1999, Benson; 2002, Kurochkin et al

Aquia Formation Turtles at Douglas Point SRMA, MD, Charles County

Note: The phylogeny of fossil turtles from the Aquia Formation is still being worked out. The following is the story of the status of turtles to date.

Testudines Linnaeus,1758 [Holroyd, Parham, Hutchison, 2005:979]
Cryptodira Cope, 1868
Trionychidae Gray, 1825 (Softshell turtles)
1. Trionychinae Gray, 1825, **Genus indet.**
Synonyms:
Family Trionychidae Bell 1928, [Hutchison and Weems, 1998:180]
Genus *Aspideretes* Hay 1904
cf. *Aspideretes virginianus* (Clark, 1895)
Synonyms: *Aspideretes virginianus* (Clark, 1895), [Weems, 1988:118]
Trionyx virginianus Clark [1895:4]
Amyda? virginiana (Clark), [Hay, 1908:515]
Amyda virginiana (Clark), [Lynn, 1929:1]

***2. Catapleura repanda* Cope, 1868,** [Hirayama, 2006]
Synonyms: *Dollochelys coatesi*, [Weems, 1988:132]

3. *Kinosternoid* indet. [Hutchison and Weems, 1998], Weems, Sept. 2008, personal communication

4. *Catapleura ruhoffi,* [Weems, 1988:129]

5. *Euclastes roundsi* [Parham, 2005:75, 76; Lynch and Parham, 2003:35]
Synonym
Osteopygis roundsi [Weems, 1988], Weems, Sept. 2008, personal communication

6. Family Toxochelydae Baur, 1895 (pdb)
Synonym **Family Cheloniidae Gray 1825, Genus indet.** [Hutchison and Weems, 1998:184]
Subfamily Osteopyginae Zangerl 1953
(Family in Gaffney and Meylan, 1988)

Osteopygis Cope 1868
Propleura Cope, 1869
Lytoloma Cope, 1869
Osteopygis emarginatus Cope, 1868
Synonym
Euclastes wielandi (combo. nov.) [Parham, 2005, not accepted]

Genus *Euclastes* Cope 1867 [Clark, 1896, Case,1901]
Euclastes? Clark, 1895:4 [1896:59]
Lytoloma? Cope, 1869, [Hay 1908, 364; also Collins and Lynn, 1936, p. 153. "Generically indeterminable"]

Primary source: http://paleodb.org and the literature.

Table 4. List of Other Taxa Found in the Aquia Formation

Planktonic Foraminifera	**Reference**
Ceratobulimina perplexa	1959, Page
Citharina plumoides (Plummer)	1959, Page
Rubulus midwayensis	1959, Page
Bulimina cacumenata	1959, Page
Globanomalina pseudomenardii (Bolli)	1959, Page
Globorotalia angulata Zone	1960, Olsson
Globorotalia psuedobulloides Zone	1960, Olsson
Globorotalia wilcoxensis (Cushman and Ponton var. acuta Toulmin)	1957 a and b, Loeblich and Tappan; 1959, Page
Globorotalia pseudoscitula (Glaessner)	1957 a and b, Loeblich and Tappan; 1959, Page
*Globorotalia convexa (*Subbotina)	1957 a and b, Loeblich and Tappan; 1959, Page
Chiloguembelina crinita (Glaessner)	1957 a and b, Loeblich and Tappan; 1959, Page
Heterohelix wiloxensis (Cushman & Ponton)	1957 a and b, Loeblich and Tappan; 1959, Page
Globigerina aquiensis (Loeblich & Tappan)	1957 a and b, Loeblich and Tappan; 1959, Page
Globigerina spiralis Bolli	1957 a and b, Loeblich and Tappan; 1959, Page
Globigerina inaequispira Subbotina	1957 a and b, Loeblich and Tappan; 1959, Page
Globigerina chascanona (Loeblich & Tappan)	1957 a and b, Loeblich and Tappan; 1959, Page
Globigerina triloculinoides	1957 a and b, Loeblich and Tappan; 1959, Page
Planktonic Foraminifera	**Reference**
Globigerina mckannai	1957 a and b, Loeblich and Tappan; 1959, Page
Globorotalia tribulosa (Loeblich & Tappan)	1957 a and b, Loeblich and Tappan; 1959, Page
Globorotalia trichotrocha (Loeblich & Tappan)	1957 a and b, Loeblich and Tappan; 1959, Page
Globorotalia perclara	1957 a and b, Loeblich and Tappan; 1959, Page

Globorotalia convexa Subbotina	1957 a and b, Loeblich and Tappan; 1959, Page
Globorotalia hispidicidaris (Loeblich & Tappan)	1957 a and b, Loeblich and Tappan; 1959, Page
Globorotalia angulata	1957 a and b, Loeblich and Tappan; 1959, Page
Globorotalia reissi	1957 a and b, Loeblich and Tappan; 1959, Page
Globorotalia acuta Toulmin	1957 a and b, Loeblich and Tappan; 1959, Page
Globorotalia apanthesma	1957 a and b, Loeblich and Tappan; 1959, Page
Globorotalia occlusa	1957 a and b, Loeblich and Tappan; 1959, Page
Globorotalia psuedoscitula	1957 a and b, Loeblich and Tappan; 1959, Page
Globorotalia psuedomenardii Bolli	1957 a and b, Loeblich and Tappan; 1959, Page
Globorotalia elongate Glaessner	1957 a and b, Loeblich and Tappan; 1959, Page
Globorotalia imitata Subbotina	1957 a and b, Loeblich and Tappan; 1959, Page
Globorotalia aequa	1957 a and b, Loeblich and Tappan; 1959, Page
Globorotalia esnaensis(?) LeRoy	1957 a and b, Loeblich and Tappan; 1959, Page; 1965, Berggren

Calcareous Nannofossils (Single-celled Algae)	
Fasciculithus tympaniformes zone Piscataway Member, Aquia Formation [NP5, CP4]	1984, Hazel et al

Pollen (Tree and other plants)		
Carya <29um	Angiosperm – flowering plant (Hickory Family)	1991, Frederickson; 1998, Frederickson
Osculapollis? colporatus	Angiosperm (normapolles group)	1991, Frederickson; 1998, Frederickson
Momipites actinus	Angiosperm (Walnut Family)	1991, Frederickson; 1998, Frederickson
Choanopollenites conspicuus	Angiosperm (normapolles group)	1991, Frederickson; 1998, Frederickson

Plants		
Pityostrobus sp.	Extinct pinaceous cone	1977, Miller

Appendix 4. List of Taxa Identified from the Internet, Collections of Amateur Collectors

Table 1. Itano Family Collection

Source: http://www.itano.net/fossils/marylan2/marylan2.htm.
Dated May 27, 2001. Collected in 1960's by Wayne, David, and Glenn Itano.
Accessed: 12/6/2007; 1/4/2008; 7/25/2008
Location: Clifton Beach, just above Smith Point, MD

Vertebrates

Reptiles

Thecachampsa sp. (crocodile teeth)
Trionyx virginiana Clark (turtle shell)

Fish

Myliobatis copeanus Clark
Otodus obliquus Agassiz
Striatolamia macrota Agassiz
Physogaleus secundus
Chimaeroid fish

Invertebrates

Molluscs

Gastropods
Turritella sp. (internal mold)

Bivalves

Ostrea compressirostra Say

Table 2: Jayson Kowinsky Collection
Source: http://fossilguy.com/sites/potomac/liv_col.htm
Dated August 8, 2005.
Authors: Jayson Kowinsky and Amy
Location: Piscataway Member, Aquia Formation, Potomac River, Charles Co. MD

Genus - Species	Common Name/ Material Found
Carcharias hopei	Sand tiger shark
Cretolamna sp. (*appendiculata?*)	Mackerel-type shark
Paleohypotodus rutoti	Sand tiger/Mackerel-type shark
Striatolamia striata	Sand tiger shark
Myliobatis sp.	Ray crushing plates
Thecachampsa sp.	Crocodile teeth, scutes, femur
Turtle plastron fragment	Indet.
Trionyx sp.	Freshwater turtle
Turritella sp.	Gastropod

Table 3. List of Taxa Found in the Late Paleocene Aquia Formation, Piscataway Member

Source: The Life and Times of Long Dead Sharks, http://www.elasmo.com/frameMe.html?file=paleo/fauna/cb_palaeo.html&menu=bin/menu_fauna-alt.html	
Authors: Jim Bourdon, Gary Grimsley, Bill Heim, and Rob Weems. Copyrighted 2002-2007.	
CHONDRICHTHYAN FAUNA	Cartilaginous fish
Ischyodus dolloi	Ratfish
SYNECHODONTIFORMES Duffin & Ward 1993	Extinct Neoselachian shark with two dorsal fins with spines and distinct clutching teeth
Paraorthacodus clarkii Eastman, 1901	Extinct synechodontid shark
HEXANCHIFORMES Buen 1926	Six- and Seven-gilled sharks, Cow shark, Primitive shark, Bluntnose shark, Broadnose shark, Big-eyed shark
cf. *Hexanchus* sp.	Extinct six-gilled shark
Notidanodon sp.	Extinct cow shark
SQUALIFORMES Goodrich 1909	Bramble shark, Dogfish shark, Rough shark, Lantern shark, Sleeper shark
Squalus cf. minor (Winkler, 1874)	Spurdog/ Spiny Dogfish shark
"Megasqualus" orpiensis Winkler, 1874	Extinct dogfish shark
SQUATINIFORMES Buen 1926	Angel shark
Squatina "prima" (Winkler, 1874)	Extinct Angel shark
HETERODONTIFORMES Berg 1937	Bullhead shark
Heterodontus cf. lerichei (Casier 1943)	Bullhead shark
ORECTOLOBIFORMES Applegate 1972	Nurse shark, Whale shark, Carpet shark, Blind shark, Zebra shark
Ginglymostoma cf. subafricanum Arambourg 1952	Extinct nurse shark
Delpitoscyllium africanum (Leriche 1927)	Extinct nurse shark
Palaeorhincodon wardi (Herman, 1975)	Extinct whale shark
LAMNIFORMES Berg 1958	Mackeral shark, Thresher shar, Megamouth shark, Ragged-tooth shark, Goblin shark, Basking shark
Anomotodon cf. novus (Winkler 1874)	Extinct goblin shark
Odontaspis winkleri (Leriche, 1905)	Smalltooth sand tiger

Palaeohypotodus rutoti (Agassiz, 1843)	Extinct sand tiger shark
Brachycarcharias lerichei (Casier, 1946)	Extinct sand tiger shark
Hypotodus verticalis (Agassiz, 1843)	Extinct sand tiger shark
Striatolamia striata (Winkler, 1874)	Extinct sand tiger- like shark
Striatolamia sp.	Extinct sand tiger- like shark
Jaekelotodus robustus (Leriche, 1921)	Extinct lamniform shark
Isurolamna inflata (Leriche, 1905)	Extinct mackerel shark
Cretalamna appendiculata (Agassiz 1843)	Extinct mackerel shark
Otodus obliquus (Agassiz, 1843)	Extinct mackerel shark
Palaeocarcharodon orientalis (Sinzow, 1899)	Extinct lamniform
CARCHARINIFORMES Compagno 1973	Requiem shark, Ground shark, Cat shark, Hound shark, Hammerhead shark, Whale shark, Blue shark
Pachygaleus lefevrei (Daimeries, 1891)	Extinct hound shark
Galeorhinus sp.	Extinct tope shark
Palaeogaleus sp.	Extinct hound shark
Triakis sp.	Extinct sound shark
? Scyliorhinus sp.	Cat shark
Scyliorhinus cf. ptychtus (Noubhani & Cappetta, 1997)	Extinct cat shark
Premontreia cf. subulidens (Arambourg, 1952)	Extinct cat shark
Abdounia beaugei (Arambourg, 1935)	Extinct requiem shark
Abdounia sp.	Extinct requiem shark
RAJIFORMES Berg 1940	Order, Skates
MYLIOBATIFORMES Compagno 1973	Order, Stingrays
Hypolophodon cf. sylvestris	Extinct stingray
Coupatezia woutersi (Winkler, 1874)	Extinct stingray
Dasyatis sp.	Whiptail Ray

cf. *"Myliobatis" dixoni* (Agassiz, 1843)	Eagle ray
"Myliobatis" sp.	Eagle ray
Rhinoptera sp.	Cow-nose ray
"Myliobatis" sulcidens	Extinct ray species
Burnhamia sp.	Extinct mobulid ray

Appendix 5. List of Taxa Collected by Mike Folmer and Chuck Bell, Douglas Point SRMA, Charles County, MD and vicinity

Genus - Species	**Common Name**
Anomotodon cf. novus	Extinct goblin shark
Anomotodon novus	Extinct goblin shark
Brachycarcharias lerichei	Extinct mackeral shark
Cretalamna appendiculata	Extinct mackerel shark
Cybium sp.	Osteichthyes - Bony fish
Delpitoscyllium africanum	Extinct nurse shark
Dollochelys coatesi	Sea turtle
Ginglymostoma africanum	Extinct nurse shark
Hetereodontus cf. lerichei	Bullhead shark
Hypolophodon cf. sylvestris	Extinct Stingray
Carcharias hopei now *Hypotodus verticalis*	Sand tiger shark
Ischyodus dolloi	Extinct ratfish
Isurolamna inflata	Extinct mackerel shark
Lamna lerichei	Mackerel shark
Myliobatis sp.	Eagle Ray
Myliobatis sulcidens	Eagle Ray
"Myliobatis" sulcidens	Extinct ray species
Notidanodon loozi	Cow shark
Odontaspis winkleri	Extinct mackerel shark
Ostracian sp.	Bony (Box) Fish
Otodus obliqus	Extinct mackerel shark
Pachygaleus lefevrei	Extinct hound shark
Palaeocarcharodon orientallis	Extinct mackeral shark
Palaeogaleus lefevrei	Extinct Hound shark
Palaeogaleus sp.	Extinct Hound shark
Palaeohypotodus rutoti	Extinct sand tiger-like shark genus
Parabula marylandica	Bony fish
Paraorthacodus clarkii	Extinct shark
Phyllodus toliapicus	Bony Fish

Scyliorhinus gilberti	Cat Shark
Scyliorhinus brivesi	Cat Shark
Squalus sp.	Dogfish shark; also spurdog
Squatina "prima"	Extinct angel shark
Striatolamia striata	Extinct sand tiger-like shark
Fish premaxillary indet.	Indet.
Thoracosaurus neocesariensis	Crocodile
Eosuchus lerichei	Crocodile
Eosuchus minor	Crocodile
Scutes indet.	Crocodile
Shell fragments	Turtle indet.
Pinaceous cone	Pityostrobus sp.
Limb bones indet.	Bird? Crocodile?
Crocodile Vertebrae	Indet.
Glyptoactis sp.	Mollusk
Ostrea compressirosta	Oyster
Turitella sp.	Sea snail
Mollusk	Indet.

Figure 6. Poster showing paleontological resources in and around the BLM Douglas Point SRMA. Specimens were donated to the BLM by Mike Folmer and Chuck Ball.

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