

## WBFC DEIS Comments and Testimony, November 2020

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**This Authorized I-495 and I-270 P3 Program DEIS Testimony is submitted on behalf of The Washington Biologists' Field Club (WBFC).** November 2020.

Our website is <https://WBFC.science>

Dear MDOT Officials:

Thank you for the opportunity to comment on this important issue.

The WBFC is **OPPOSED** to the highway expansion project including the American Legion Bridge (ALB) expansion part.

WBFC supports the **NO BUILD OPTION**

None of the other presented **DEIS** alternatives are acceptable.

**WBFC considers the DEIS legally faulty and incomplete for many reasons, including:**

- Destruction and disturbance of State of Maryland and National parklands with wetlands, including but not limited to several miles of Rock Creek Regional Park (including moving substantial stretches of Rock Creek), and ca. 80 acres of the Chesapeake & Ohio National Historical Park (CONHP), including ca. 5 acres of the 12 acre Plummers Island and moving "Rock Run".
- The destruction of "Rock Run Culvert" in building the American Legion Bridge violates the integrity of Plummers Island (CONHP, Montgomery Co., Maryland).
- Lack of understanding or recognition of the value of the extensive historical and ongoing biological research on Plummers Island and the WBFC's 120 years of contributions and commitments to that. Records of many rare plants, animals and habitats from the Island were not considered.

- Lack of Due Diligence on study of impacts on Plummerville Island's wetlands and rare plant communities, and rare plant and animal species (the evaluation of the organisms on the Island was apparently based on one summertime visit to the head of the Island in 2019). DEIS APPENDIX L. (Natural Resources Technical Report) subordinate Appendices A-R cover Natural Resources considered along the route. As is documented below, APPENDIX L is woefully incomplete as concerns Plummerville Island. Plummerville Island is in the large Potomac River / Rock Run (PR/RR) Natural Resources unit. The DEIS surveys for rare plants and animals on the Island was cursory, brief, and at the wrong season of the year to identify many of the organisms of concern.
- Lack of alternatives to condemning part of Plummerville Island for the ALB proposed project.
- Lack of consideration of the impact of the Covid-19 epidemic on present and future transportation loads and patterns (many folks are teleworking and attending virtual meetings). With peak traffic flows down due to changed behavior patterns resulting from Covid-19, toll lanes will be unlikely to provide revenue streams of sufficient reward to P3 contractors, likely leaving taxpayers on the hook for billions of dollars.
- Lack of forward thinking on Climate Change (only more cars powered by petrol).
- Lack of accepted Build options with mass transportation options (trains, light rail, monorail, etc.)
- Massive costs, with near certain cost overruns passed on to taxpayers. Regarding Washington Suburban Sanitary Commission (WSSC) expenditures, estimated to be \$2 billion, it remains unclear if ratepayers would be responsible for this cost.
- Toll lanes that could cost as much as \$50 in peak traffic hours, which would provide little benefit to the average commuter.
- Massive traffic congestion and delays during the construction period lasting 5-10 years, after which the traffic flow will be just as congested as it was prior to the construction due to the encouragement of more cars to be on the road, also known as induced demand.
- Because the DEIS's analysis is incomplete, it is impossible for the concerned Agencies to assess, and the public to comment on, the proposed project's impacts. The Agencies cannot wait until a final EIS is complete to analyze the project's full impacts, as it will then be too late for the public to meaningfully comment on them and for the Agencies to consider the public's comments and choose the alternative that best alleviates the impacts based on this information. We respectfully request that the Agencies conduct a supplemental EIS to provide

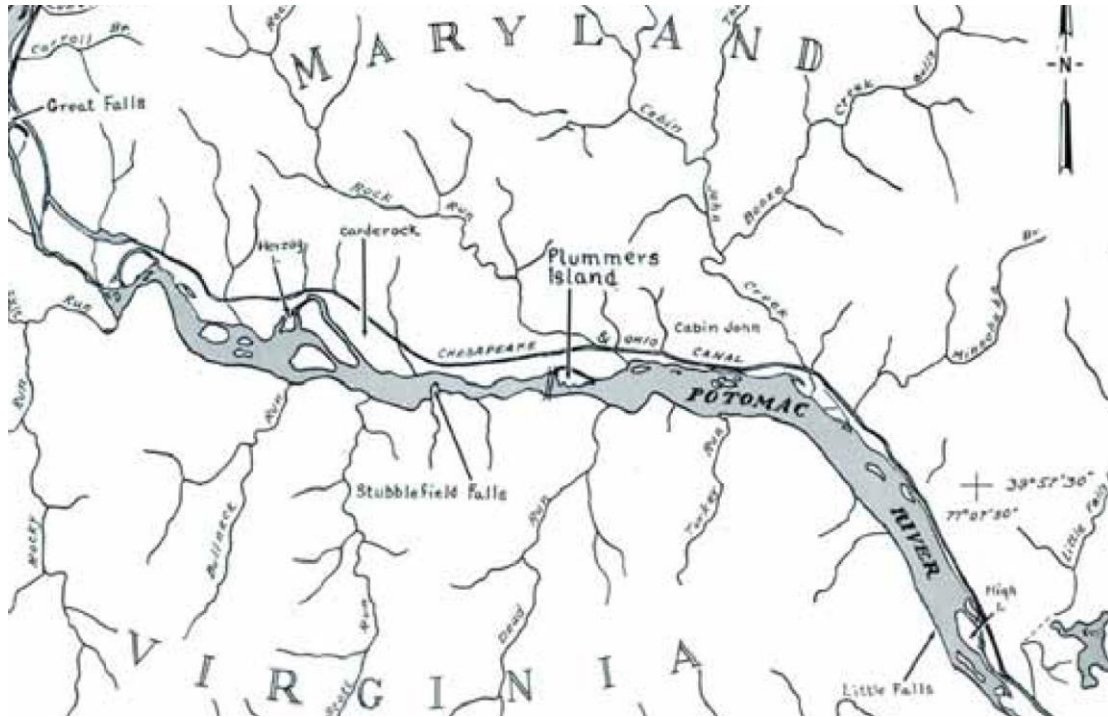
the public the ability to meaningfully review and comment on the impacts before a final EIS is produced.

### **Alternative placement of the Bridge not considered in the DEIS**

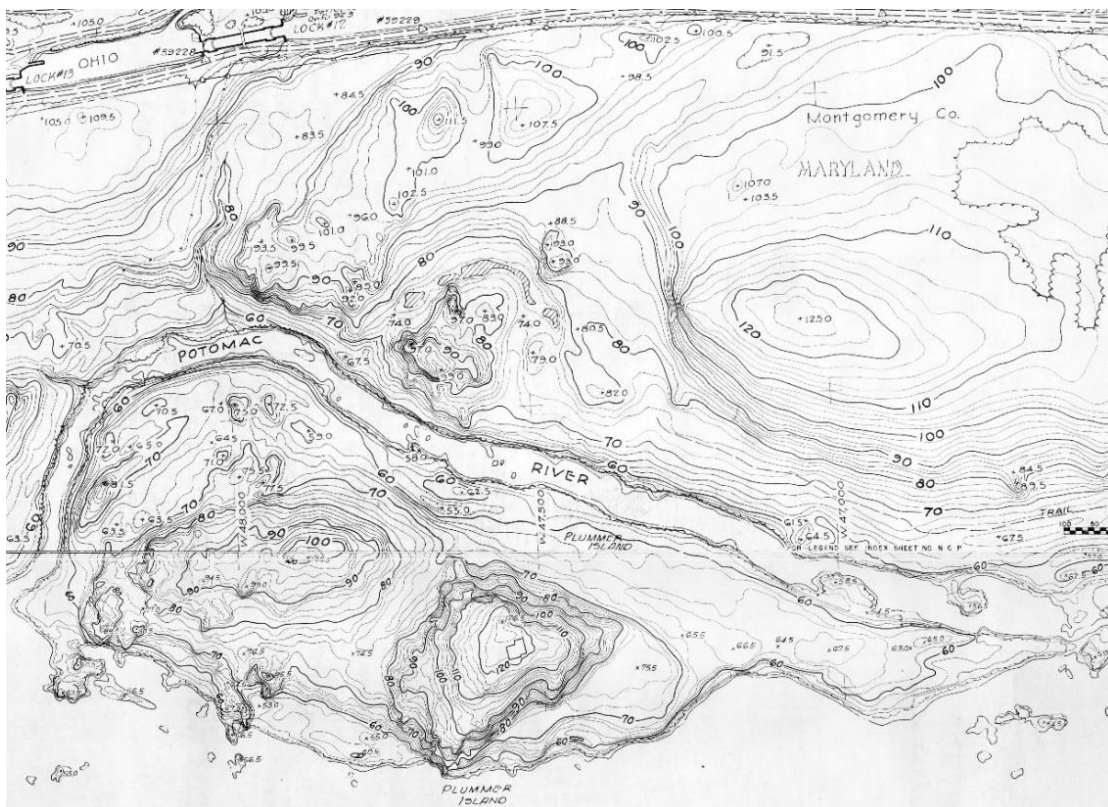
- MDOT should consider building and placing construction platforms only upstream from the current bridge to reduce impacts to the Chesapeake and Ohio Canal NHP and Plummers Island.
- MDOT should consider construction of other crossings to alleviate traffic over the ALB instead of bridge enlargement.
- We respectfully ask that agencies consider these options to the ALB portion of this project to reduce and minimize impacts to Plummers Island and the surrounding area.

**WBFC Background.** The WBFC (the Club) was founded in 1900 by professional field biologists living and working in the Washington, DC vicinity (Perry 2007). Perry (2007) provides a detailed history of the Club, the Island, and brief biographies of the hundreds of past and present members up to that time. The members are all professional biologists. Plummers Island, Chesapeake & Ohio Canal National Historical Park, Montgomery County, Maryland, has been the WBFC research station and meeting place since 1901 (Appendix 1). Plummers Island is located immediately downstream from the ALB. The Island covers 12.2 acres of land, the widest part of which is on the ALB end. The proposed expansion of the ALB, as part of the I-495 expansion, threatens the existence, and violates the integrity, of the Island as a designated **natural wild area** (Appendix 2). “Rock Run Culvert” as identified in the DEIS is actually a natural Potomac River channel that has divided the Island from the mainland since time immemorial (Perry 2007). There is a small true concrete and pipe culvert running under the ALB which drains into the river channel where the channel bends eastward (water apparently rarely flows from this ALB culvert).

The current ALB proposal would cut across the Island, move or destroy the true channel “Culvert” that separates the Island from the mainland, clear the trees and level a substantial part of the Island, **clear the significant healthy native beech tree forest on the mainland side** (Popkin 2019, [a deadly beech disease is spreading in the NE US](#)), destroy the wetlands associated with the island and mainland, and result in major infestations of invasive plants. **If implemented this DEIS project would jeopardize future research on trends in biodiversity on the Island.** Noise pollution from expanding the ALB onto the Island would make WBFC meetings meetings on the Island nearly impossible.



Old map (above) showing the real Rock Run and Plummers Island (copied from Perry 2007). Map of Plummers Island Pre-ALB (below). Calling the Potomac River channel “Rock Run Culvert” allows it to be “excluded” from consideration as a protected wetland in the DEIS Natural Resources APPENDIX L. It is not a Culvert! And “Rock Run” has been misapplied to it.







Head of Plummers Island adjacent to ALB separated by “Rock Run” channel or “Culvert” from the mainland, showing Potomac Gorge Riverside Outcrop Barrens, wetland mud flats (inundated here) and sandbars.

The Draft EIS is seriously flawed in many ways. The most pertinent to the WBFC is the failure to discuss and evaluate the impact of the destruction of part of Plummers Island, a historical and biological treasure within the Chesapeake and Ohio Canal National Historical Park. There is not even a footnote about the incalculable value of the long-term research on the biology of this Island, and nothing about WBFC’s place in it.

The WBFC leased Plummers Island in June 8, 1901, for a meeting place and research station, and built the cabin that year. The WBFC finally settled the legal purchase the property known as Plummers Island (Appendix 1), and most of the adjacent mainland up to the C&O Canal Tow Path, in **1908** (Perry 2007).

The Club has been meeting on Plummers Island continuously for nearly 120 years, and conducting research there on a wide range of subjects. The Club gave the property to the National Park Service on July 24, 1959, with the written understanding (Appendix 2) that the Club retained the right to maintain the island as a **natural wild area**, use it for scientific

research, for meetings of the Club, and to pursue its studies in the field of biology and natural history.

Plummers Island is known as **“The most thoroughly studied island in North America”**, and perhaps in the world.



The Club holds events each year on the Island where members gather with guests. We maintain the historic Club cabin, “Winnemana Lodge,” built in 1901. The name Winnemana was the name originally given to the cabin (Lodge) in 1906 and is translated from a Native American language meaning "beautiful island." The epithet *winnemana* has been given to Latin names for various insects and mammals described from Plummers Island collections.





**Winnemana Lodge** built in 1901. The Cabin is still standing and well maintained by WBFC.

There are always research projects ongoing on the Island, conducted both by members and by grantees funded by our Endowment Research funds. Many of these projects run for years, and are follow-ups to pre-ALB censuses, showing impacts of pollution, and changes in fauna and flora. WBFC reviews dozens of research grant proposals each year and usually funds 5 to 10 of them each year, with first priority given to studies on the Island, second priority to the Potomac Gorge, eventually allowing studies in the Mid-Atlantic region. Voucher specimens for plants and animals collected for the scientific studies on the Island are housed and catalogued in the National Museum of Natural History, Smithsonian Institution. These specimens and observations from catch and release and other sightings are reported in hundreds of published scientific papers.

The ALB was constructed immediately to the west (up river) of the island starting in 1962. The placement of the original bridge was intentionally positioned to protect the Island (Appendix 2 & 3) to ensure the continuation of WBFC's valuable long-term biological research program.

When the ALB was expanded in the early 1990s, the expansion was done by filling in the gap between the north and south-bound lanes, again avoiding direct damage to the Island. Despite the best efforts of engineers and construction implementation to avoid impacting the Island, the original ALB construction and 1992 expansion led to many invasive plants infesting the Island, and disturbing the water flow to its flanking wetlands. The worst of the invasive plant infestations are on the head of the Island adjacent to the ALB. Negative impacts of local environmental pollution on lichens and insects have been documented on the Island. Traffic on the ALB also led to Lead pollution from vehicle exhaust and declines in lichen species, which are particularly sensitive, from 70 to 20 (Lawrey & Hale 1979). This illustrates the importance of long-term scientific research on the Island, which influenced legislation to reduce lead in gasoline, and eventual reduction in lead contamination locally and world-wide.

Excerpt of Washington Post article 19 May 1994 by D'Vera Cohn about lichens and Pollution.

Lichen research also shows that the bridge has become a dominant factor in shaping the island's ecology.

Lichens, which are crusty combinations of algae and fungus, are superb barometers of pollution. They soak up nutrition from the air, along with any toxins hanging about. There were 70 species of lichen on Plummers Island at the turn of the century; now there are 20.

Their decline began after the bridge was built. When Lawrey and his late colleague and mentor, Mason Hale, scraped lichen samples off rocks and had them analyzed, they found their lead content had more than tripled from 1958 to 1970. Their joint article on their findings, blaming car exhaust for the pollution, was published in the journal *Science* in 1979.

Recent lichen research is more encouraging. Lead concentrations have been dropping, in tandem with the phasing out of leaded gasoline. Eventually, Lawrey hopes, the number of lichen species will rise, as has happened in other locales.

"We'll have to just wait and see," he said. "Fortunately, the club will be here forever, and some club member—if it is not me—will find out the answer."



Since 1901, over 400 scientific publications have focused on the Island's biota: birds, fish, mammals, reptiles and amphibians, plants, insects, arachnids, nematodes, and other groups (Many published titles in the Proceedings of the Biological Society of Washington, available at <https://WBFC.science/biological-studies/>) (see Appendix 7 for titles in this series)

An article in the Potomac Basin Reporter (1973) (Appendix 4) cited "1,226 species of plants and 4,293 species of animals on the Island...." including "1500 species of beetles" and "300 to 400 species of bees". The Island "is 'type-locality' for at least 175 species, ..." "No less than 16 genera and three families of plants and animals have been described on the basis of specimens collected on the Island." Some of these numbers were overestimates made before computer databases were compiled. Insect inventories are still substantially incomplete (see Brown & Bahr 2008). The number of vascular plants recorded on the Island, stands around 900 (Shetler et al. 2006; including newer records).

Many thousands of plants and animals have been documented from Plummers Island over 120 years of WBFC research.

### **Invertebrates on the Island**

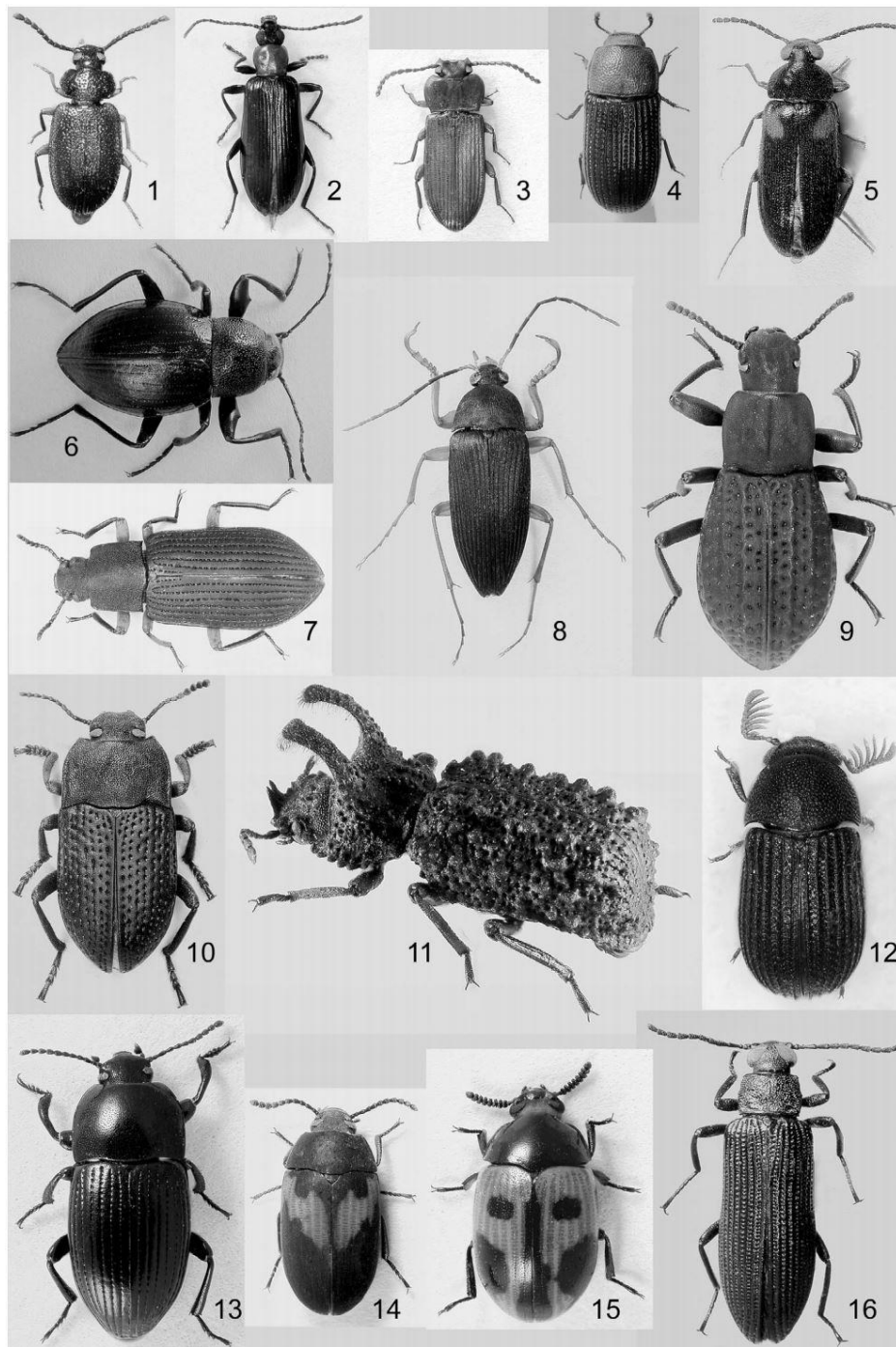
The Brown & Bahr (2008b) appendix lists all Invertebrate taxa known from the Island, including Insects. (Taxa are taxonomic groups of any rank, such as a species, genus, family, order, or class).

### **Class Insecta diversity on the Island**

Brown & Bahr (2008a & b) documented the known insect species records for the Island. "Based on an examination of the insect collection of the National Museum of Natural History and a review of relevant literature, we document 3012 insect species in 253 families, encompassing 18 insect orders: Collembola, Odonata, Dermaptera, Blattodea, Phasmatodea, Orthoptera, Psocoptera, Thysanoptera, Hemiptera, Neuroptera, Megaloptera, Coleoptera (beetles), Mecoptera, Trichoptera, Lepidoptera, Diptera, Siphonaptera, and Hymenoptera." The authors acknowledge that 16 families of the 600 beetle species have been recorded for the Island, yet they conclude this probably includes only a quarter of the families likely present. Among insects recorded from Plummers Island are 836 species of butterflies and moths (Lepidoptera), with 27 different species of moths described from specimens collected on the island (Brown et al. 2008). Many of these species were described from collections made on the Island. **No site in North America has been surveyed as intensively, yet much of the insect fauna remains to be studied, with hundreds of additional species likely to be documented.**

Many of these Insect orders depend on wetland habitats for all or much of their life-cycles. Seven types of wetlands are characterized on the Island (Simmons et al. 2016, units 1-5).

Steiner (2000) documented a globally and state-rare click beetle on the Island. Steiner (2008) inventoried 128 species of Tenebrionidae beetles from Maryland, most of which occur on Plummers Island.



A few of the many Tenebrionidae from Plummers Island and nearby. (Steiner 2008 fig. 1-16)

In 2015 Steiner collected the first Emerald Ash Borer (EAB) on the Island. Within the following two years nearly all the mature American and Green Ash trees on the Island were dead or dying. These trees were major components of vegetation types 5 to 11 (see Plummers Island Plant Communities section, below), and they have been decimated over much of Eastern North America.



Imperial moth caterpillar (*Eacles imperialis*) at head Plummers Island, Oct. 2013 (Soreng photo). These moths are rarely seen any more in the area.

Insects, like other organisms, are experiencing major declines globally (Borenstein 2018; Hallman et al. 2017; Jarvis 2018; Vogel 2017). Giant silk moths (Saturniidae) include Imperial, Cercropia, Luna, Polyphemus, Royal Walnut, Rosy maple etc. In New England, most of these are state endangered species because they have been hammered by an introduced biocontrol agent -- a non-native tachinid fly, *Compsilura concinna*, which was introduced to try and control gypsy moths in Massachusetts. That fly has wreaked havoc in New England because it is a generalist and the Saturniids have been heavily impacted. This pest has arrived in DC and vicinity but impacts here are not yet known (John Lil pers. comm. 2020). Thanks to the long



history of research on insects of Plummers Island, the Island would be a key place to further document this “insect apocalypse,” assuming the Island remains intact. *The DEIS ALB project puts WBFC Plummers Island research on trends in biodiversity in jeopardy.*

### **Birds on the Island and American Legion Bridge**

An established Peregrine Falcon nest is located on the American Legion Bridge and two adults and at least one chick was observed this past June (Putnam 2020). The nest box was put there by MD State Highway Association (SHD) working with US Fish & Wildlife Service (USFWS) in 2007, and peregrines have been nesting there for 12 years. In the DEIS document, “*they propose moving the nest box to another location just before nesting season when the bridge constructions begins, but as an established nest this recommendation may not be successful*” (Carla Dove, WBFC member, Smithsonian Ornithologist, pers. comm.). A Mississippi Kite was also observed this year. Wetmore & Manville (in Manville 1968) account for birds known from the Island to that time. Johnston & Winings (1987) attribute the decline of forest breeding birds on the Island and vicinity to vehicular traffic.

### **Mammals on the Island**

Five bat species are documented by Smithsonian collections from the Island. Among these are the Endangered northern long-eared bat, *Myotis septentrionalis*, and the eastern small-footed Myotis, *Myotis leibii*. The latter was separately described as *Myotis winnemana*. Other mammals collected include shrews, moles, mice, voles, eastern cottontail, eastern gray squirrel, Georgian bat, large brown bat, red bat, evening bat, whitetail deer, eastern skunk, mink, eastern long-tailed weasel, fox squirrel, eastern flying squirrel, eastern otter, chipmunk, eastern red fox, Virginia muskrat, and woodchucks have also been recorded (Manville 1968). Mammalogists these days often monitor by catch and release and other methods, rather than preparing museum specimens from animals on the Island. For example, the last regional report of an eastern wood rat was reported on Plummers Island. Also, DNA from bones, feathers, fur, or feces can now be used to precisely identify species.

### **Plummers Island Plant Communities**

The National Park Service prepared a map of the vegetation zones in the region with a coarse map for Plummers Island. The plant communities were remapped in finer detail in 2016

(Simmons et al. 2016). (Appendix 6, also available at WBFC.science). This map included 12 communities, 8 within wetlands, and one upland type that is unique to the Potomac Gorge. These plant communities are proxies for where other organisms also live or might be found.

### **Plummers Island wetlands (units 1 to 7).**

The Island's wetland habitats were mapped by Simmons et al. (2016). These were divided into 5 major communities, and 3 subdivisions within those. These include sandbars and mud flats (units 1 & 2), rocky outcrop barrens (3A & B), to regularly flooded bottom land forests (4-6). These areas flood frequently. Community 7 is higher and infrequently flooded. Community 8, i Piedmont Basic Mesic Forest, includes a rich herb layer that is rare in the Potomac Gorge and is rarely flooded.

The sandbars, mud flats, and rock barrens occur on the Potomac River side. Mud flats also occur along the usually sluggish "Rock Run" channel. The flooded bottom bench lands (units 5, 6 & 7) cover much of the area adjacent to "Rock Run" channel and the toe of the Island. There are some rock-bottomed swales in the interior the Island (unit 5A). The low benches are mostly flooded only when high waters reach above the 9 ft mark at Little Falls Gauging Station (3 miles downstream)

(<https://water.weather.gov/ahps2/hydrograph.php?gage=brkm2&wfo=lwx>). This level is reached or exceeded often in winter and spring, but frequency and duration vary greatly from year to year. There are rare plants and animals in these zones. Many species records for the Island come only from these zones, and many of these species are reliant on these different wetland habitats for some or all of their life-cycles. Flooding above the 4.5 ft mark, basically makes the Island inaccessible even by wading, and covers all the sand and mud flats up to the breaks to the bench lands. See Brown & Bahr (2008) for Insect inhabitants of the riparian zones.

**Populations of two rare plants of concern were observed within the zone of disturbance in the riverside mud flats (Simmons et al. 2016, unit 1) on 31 October 2020 *Hibiscus laevis* and *Paspalum fluitans*. Neither of these were reported by the survey crew contracted for the DEIS. Any DEIS related construction plans should seek to avoid changes to water flowing to Plummers Island wetlands including "Rock Run" channel.**



*Hibiscus laevis* in mud flats between Potomac Gorge Riverside Outcrop Barrens (by DEIS SHH102 survey stake, Soreng photo 2020). This species also occurs at the closer head of the Island

### **Potomac Gorge Riverside Outcrop Barrens**

The rocky Potomac Gorge headlands on Plummers Island harbor the rare *Solidago racemosa*, and *Hypericum prolificum*. These barrens are routinely scoured by high floods, but these plants hang on!





*Solidago racemosa*, Potomac Gorge Riverside Outcrop Barrens at the head of the Island (Soreng photo 2020).



Potomac Gorge Riverside Outcrop Barrens near the head of the Island *Hibiscus laevis* in foreground. ALB in background (Simmons photo 2020).



**Piedmont Basic Mesic Forest (unit 8).**

This vegetation zone floods rarely, being more than 15 ft above the low flow. This area is rich in herbaceous plant species known only here on the island. And it is gorgeous to see in the spring. It includes the largest population of *Jeffersonia diphylla* (Twinleaf) that we know of in the Potomac Gorge. The rare *Phacelia covillei* thrives here, as does the rare *Erigenia bulbosa* and *Valeriana pauciflora*, and the leatherwood shrub, *Dirca palustris*.



Piedmont Basic Mesic Forest includes a large stand of *Jeffersonia diphylla* (Soreng photo).

**Potomac River Bedrock Terrace Hardpan Forest (unit 12)**

This Globally and State rare plant community is endemic to the Potomac River Gorge. On the Island it covers the east and west knolls which rarely ever flood, being as much as 60 ft above



the riparian zone. The vegetation is markedly different from the other zones as soils are thin over bedrock, and the trees and shrubs are stunted and slow growing. Various sedges and grass species (e.g. including *Melica mutica*, *Dichanthelium aciculare*, *Piptochaetium avenaceum*), and trees and shrubs, are only known from this zone on the Island.



Potomac River Bedrock Terrace Hardpan Forest (unit 12) – *Piptochaetium avenaceum* / blackseed needle grass glade on ALB survey line. The bridge is visible in the background (Simmons photo 2020).

### **The Potomac Gorge is a gem among our National Parks**

(<https://academic.oup.com/bioscience/article/54/1/8/234660>),

Plummers Island is a special part of the middle section of the Potomac Gorge. The plant and animal diversity are tremendous with many rare species and long-term ongoing research projects. State and Globally rare plants and Natural Vegetation Communities are documented in Simmons et al. 2016 & 2000 (Appendix 5 & 6). These reports were based on over 120 years



of collecting plants and making herbarium vouchers (detailed in Shetler et al. 2006), species surveys for a DNA barcoding project led by J. W. Kress (Gambino, 2009), and vegetation plots established from 1998 to 2000 by E. Fortson-Wells to document invasive plants in the flood plains of the island, followed up by a three year survey of invasive plants and vegetation between 2012 and 2015, conducted by the WBFC Invasive Biota Committee. Voucher specimens, housed at the United States National Herbarium, Department of Botany, National Museum of Natural History, Smithsonian Institution, are recorded and mostly imaged (records available online at <https://collections.nmnh.si.edu/search/botany/>). Many plants and animals occur in the Potomac Gorge at the northern extensions of their geographic ranges.

Many biologists have walked and observed every nook and cranny of this topographically diverse island with its rocky hills and cliffs, including the globally and state rare **Potomac River Bedrock Terrace Hardpan Forest**, and sensitive **wetland bottoms** of “Rock Run” Channel and sand lenses and mud flats on the Potomac River side of the Island. We love this place and its historical, current, and hopefully future biological relevance. **Rebuilding and expanding any part of the American Legion Bridge or access to that on the Island would destroy or seriously damage much of it and violate the integrity of the Island.**

The noise pollution and visual impact of the current ALB are annoying at best to our meetings on the Island. Expanding the ABL onto the Island will make conversation at meetings at the Cabin on the Island nearly impossible. The noise and air pollution will be much worse during the construction phase. The noise impact on birds may be more extreme (Johnston & Winings 1987). Rare plants and animals and habitat will be lost. It will no longer be “Winnemana”, a beautiful island.

If you argue otherwise, we are lost as a Nation. The efforts of science are meaningless. Losing even a piece of this Island is to lose the heart and soul of what our conservation ethic means.

We believe Plummerville Island is as important as any of the national museums in Washington, DC, and WBFC members *implore* MDOT to preserve intact this **Historical and Biological National Treasure**.

Please visit our web site – <https://WBFC.science>

Thank you

WBFC President, Vice President, and members

Ralph P. Eckerlin

Robert S. Searcy

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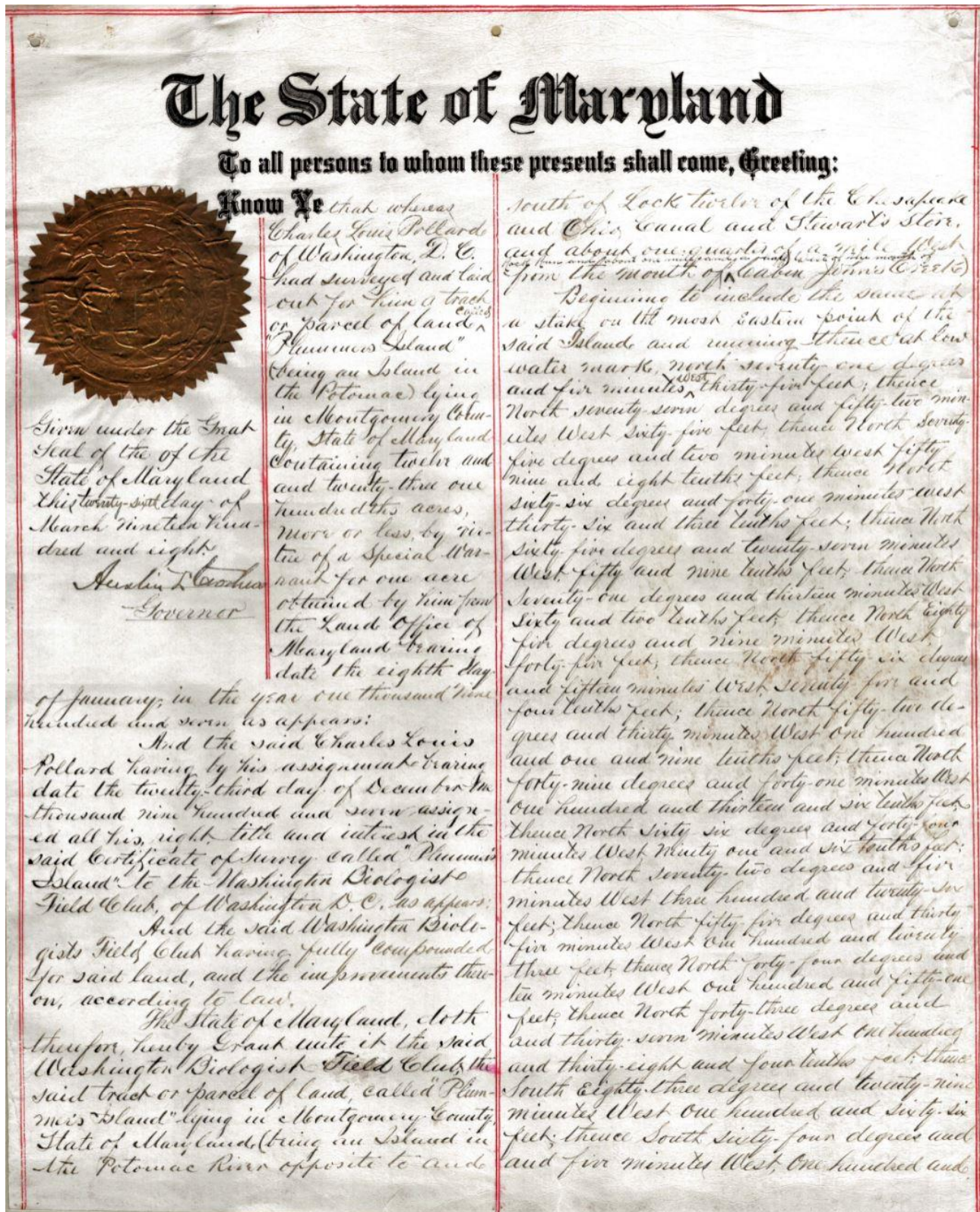


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**Appendices:**

1. WBFC Deed to Plummers Island (1908).
2. Transfer of the WBFC property to United States Government (1959).
3. Washington Post article, 1959
4. Potomac Basin Reporter, 1973 [Plummer Island Beetles & Bees and Type locality]
5. Rare Flora and Natural Communities of Plummers Island, Montgomery County. Maryland.
6. Natural Communities of Plummers Island, Montgomery County, Maryland.  
(Vegetation plots are numbered. Plot 4 was lost due to the ALB abutments redirecting the flow of Rock Run Channel / "Culvert" between 2000 and 2013. Plots not mapped, nor are two newer plots and older NPS plots)
7. Titles in the Bulletin of the Biological Society of Washington series "Natural History of Plummers Island, Maryland," and other key publications.

Appendix 1. Title to Plummers Island and adjacent mainland





## Appendix 1. cont.

twenty-six and two tenths feet; thence South twenty-four degrees and thirty-three minutes West one hundred and twenty-five feet; thence South twenty degrees and ten minutes West One hundred and sixty-eight and six tenths feet; thence South sixteen degrees and forty minutes East one hundred and eight feet; thence South sixty-four degrees East two hundred and fifty and one hundredth feet; thence North seventy-five degrees and forty-nine minutes East sixty-seven and six tenths feet; thence South sixty-one degrees and thirty-six minutes East two hundred and twelve feet; thence South forty degrees and fifteen minutes East one hundred and thirty feet to a point on Cactus Rock; thence North seventy-seven degrees and forty-one minutes East seventy-six and eight tenths feet; thence South seventy-one degrees and thirty-two minutes East sixty-eight and eight tenths feet; thence North seventy-five degrees and fifty-three minutes East forty-five and four tenths feet; thence South sixty-six degrees and forty-six minutes East forty-nine and seven tenths feet; thence North eighty degrees and fifty-eight minutes East ninety-one and five tenths feet; thence North sixty-four degrees and fifty-one minutes East one hundred and twelve and seventy-two hundredths feet; thence North seventy degrees and thirty-four minutes East one hundred and seventeen and one tenth feet; thence South seventy-eight degrees and forty minutes East ninety-two feet; thence South forty-one degrees and twenty-seven minutes East eighty-seven and one tenth feet; thence South eighty-eight degrees and fifty-four minutes East forty-five and four tenths feet; thence North seventy-one degrees and forty-four minutes East sixty-nine and two tenths feet; thence North seventy-eight degrees and seven minutes East fifty-four and four tenths feet; thence North eighty-three degrees and thirty-seven minutes East thirty-seven and five tenths feet; thence North eighty-nine degrees and fifty minutes East sixty-one

and one ~~thirty~~ tenth feet; thence North eighty-six degrees and twenty minutes East Sixty-seven and three tenths feet; thence North eighty-six degrees and eighteen minutes East thirty-six and two tenths feet to the place of beginning.

Containing and now laid out for twelve and twenty three hundredths of an acre of land, more or less, according to the Certificate of Survey thereof taken and returned into the Land Office of Maryland and bearing date the twenty-third day of March one thousand nine hundred and seven, and there remaining.

Together with all rights, profits, benefits and privileges thereto belonging. To Have and to hold the same unto it the said Washington Biologist Field Club its heirs and assigns forever.

Land Office of Maryland, Secy.

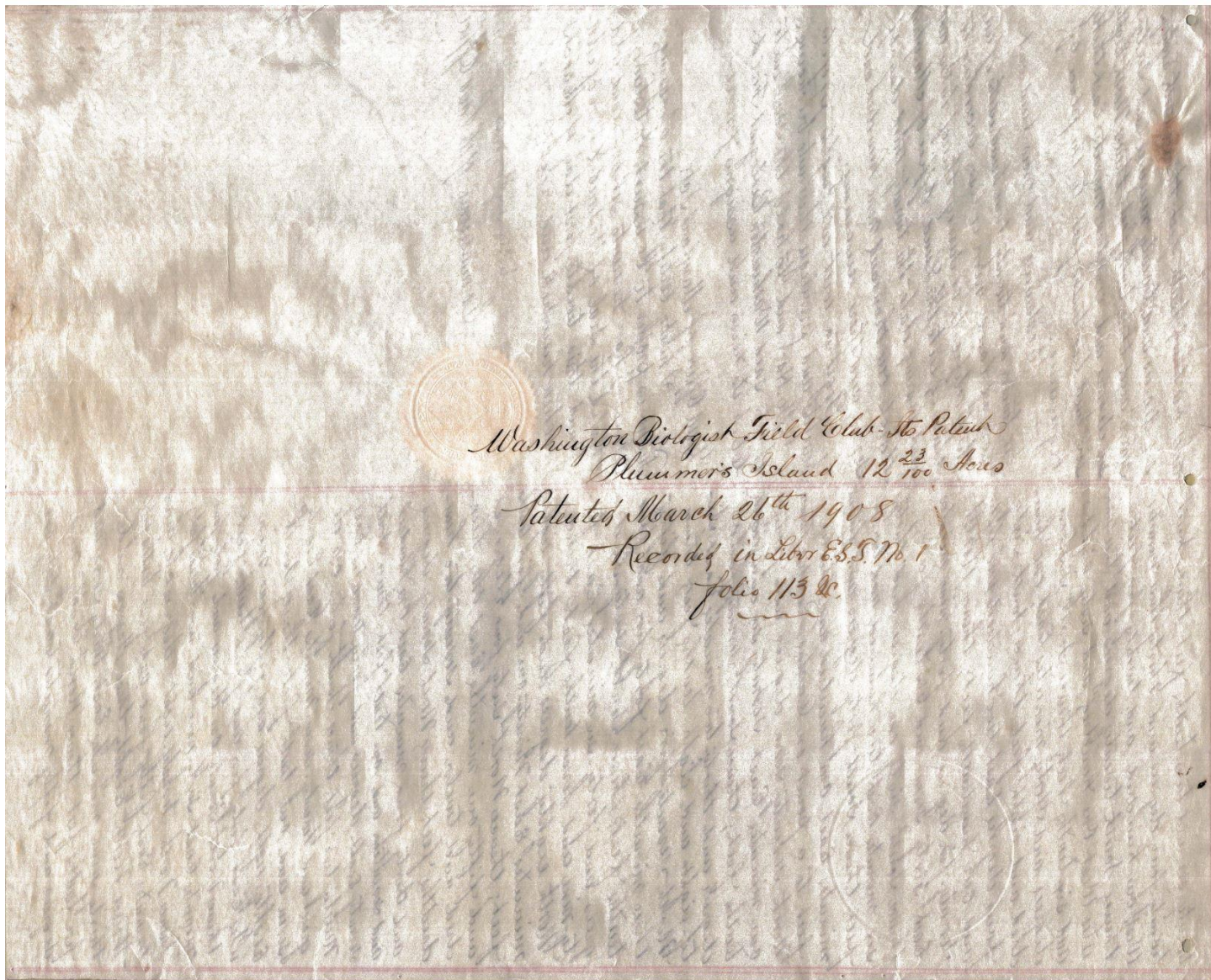
I hereby certify that the foregoing Patent is proper to be issued. In testimony whereof I have herewith set my hand and affixed the Seal of the Land Office of Maryland this twenty-first day of March Nineteen hundred and eight.



Ed Stanley Goodwin  
Commissioner of the Land Office



**Appendix 1. cont.**





**Appendix 2 AGREEMENT WITH NATIONAL PARK SERVICE, 1959**

**AGREEMENT WITH NATIONAL PARK SERVICE**

**AGREEMENT AND STIPULATIONS BETWEEN THE WASHINGTON BIOLOGISTS' FIELD CLUB, INC. AND THE UNITED STATES OF AMERICA**

This agreement made this 5th day of March, 1959, by and between the Washington Biologists' Field Club, Inc. and the United States of America.

WITNESSETH:

WHEREAS, The United States Government has by condemnation proceedings, in the United States District Court for the District of Maryland in Civil No. 10676 and by order of Court made the 24th day of June, taken possession of the defendant's Washington Biologists' Field Club, property designated in said proceedings as parcels "A" and "B" in tract no. 7, and

WHEREAS, This property was acquired by the Washington Biologists' Field Club, Inc. and has been used by the said Club as a natural wild area for scientific research for over 50 years and a great many scientific papers have been written in reference to biological and natural history discoveries made on said land and, more particularly, on that part of said land known as parcel "B" and more familiarly known as Plummers Island containing some 12.238 acres more or less, and

WHEREAS, The said Plummers Island has become among systematic biologists one of the world's most famous collecting spots and type localities, and

WHEREAS, The discoveries have indicated the probability of new knowledge in the field of biology and natural history, and

WHEREAS, The fame of this island is world-wide and many scientific organizations are interested in its preservation as a source of discovery, and

WHEREAS, The Washington Biologists' Field Club, Inc. and the United States Government desire to preserve this natural wild area as a sanctuary and scientific research preserve.

Therefore, The United States Government's petitioner in the United States District Court for the District of Maryland in Civil No. 10676 and the Washington Biologists' Field Club, Inc., defendant, and the owner of said parcel of land known as parcel "B" containing some 12.238 acres more or less which said land is an island in the Potomac River and is more familiarly known as Plummers Island, do hereby stipulate and agree that the said parcel "B" be withdrawn from these proceedings and that the said Washington Biologists' Field Club, Inc. does hereby agree to deed the said island to the United States Government without monetary consideration reserving in said deed to the Washington Biologists' Field Club, Inc., the right to continue to maintain the island as a natural wild area and use it for scientific research and for meetings of the Club and to pursue its studies in the field of biology and natural history on the said island so long as the Washington Biologists' Field Club, Inc. exists and desires to continue to use the island for scientific research and so long as the further provisions and stipulations contained herein are complied with which are as follows:

1. The Washington Biologists' Field Club, Inc. agrees to supply the National Park Service with copies of scientific papers resulting from research conducted on said island when available.
2. The Washington Biologists' Field Club, Inc. will supply the National Park Service with an annual report and will include the names and addresses of the officers, list of the members, and a summarization of the scientific investigations carried on.
3. The Washington Biologists' Field Club, Inc. will indemnify the United States against any loss or damage or injury due to the Club's negligence or any of its members or guests in the use and occupancy permitted under this agreement.
4. The Washington Biologists' Field Club, Inc. shall maintain its building and facilities on the island or replace the same in orderly and safe condition without expense to the United States.
5. No additional buildings, structures, or other physical facilities shall be constructed on the island by the Washington Biologists' Field Club, Inc. without first obtaining written approval of the National Park Service.
6. It is further stipulated and agreed between the United States Government and the Washington Biologists' Field Club, Inc. that the membership of the Club as constituted on I August 1958,

Honorary Members:

Johnson , David H.  
Kelson, Keith R.  
Killip. E. P.

Vogt, George B.  
Walker, Ernest P.  
Wetmore, Alexander

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Bartsch, Paul  
Mann, William M.  
Ricker, P. L.

### Active Members:

Aldrich, John W.  
Appel, William D.  
Benedict, J. E.  
Blake, S. F.  
Brown, Edgar  
Clarke, J. F. G.  
Compton, Lawrence V.  
Davis, Malcolm  
Duvall, Allen J.  
Erickson, Ray C.  
Erlanson, C. O.  
Fredine, C. Gordon  
Fuller, Henry S  
Gabrielson, Ira N.  
Gardner, Marshall C.  
Graham, Edward H.  
Griffith, Richard E.  
Handley, C. O., Jr.  
Hotchkiss, Neil  
Jackson, Hartley H. T.

Krombein, Karl V.  
Leonard, Emery C.  
Lincoln, Frederick C.  
Linduska, Joseph P.  
Meehean, O. Lloyd  
Morrison, J. P. E.  
Nelson, A. L.  
Oehser, Paul H.  
Parker, Kenneth W.  
Presnall, Clifford C.  
Reed, Theodore H.  
Russell, Paul G.  
Setzer, Henry W.  
Smith, Albert C.  
Smith, Lyman B.  
Sohns, Ernest R.  
Stevenson, James O.  
Stewart, Robert E.  
Stickel, William H  
Swift, Ernest F.  
Uhler, F. M.

Zahniser, Howard  
Nonresident  
Members:  
Allan, Philip F.  
Allen, Durward L.  
Archino, Samuel  
Bartlett, H. H.  
Bryant, Harold C.  
Cahalane, Victor H.  
Cottam, Clarence  
Couch, Leo K.  
Dargan, Lucas M.  
Eklund, Carl R.  
Fowler, James A.  
Hamlet, John  
Holt, Ernest O.  
McAtee, W. L.  
Myers, G. S.  
Peterson, Roger T.  
Wallis, William W.  
Wherry, Edgar T.

shall have the privilege of having their ashes placed on said island and a small bronze plaque in their memory placed on the stones of said island and that this privilege shall apply only to the membership as named above as it shall exist as of 1 August 1958.

7. It is further stipulated and agreed that the United States Government will allow the membership of the Washington Biologists' Field Club, Inc. to have access by foot over the land owned by the United States Government to the island at all times and whenever desired.
8. The Washington Biologists' Field Club, Inc. will be permitted to maintain and operate passenger-carrying ferry boats from and to the island which is to be for the exclusive use of the Club and its members and guests for access to the island.
9. The Washington Biologists' Field Club, Inc. will be permitted to erect and maintain a fence and gate at a suitable location to exclude the general public from the island, but the National Park Service is to be furnished keys to the lock or the National Park

Service may provide its own lock if keys are delivered to the Washington Biologists' Field Club, Inc., and will also be permitted to clear the channel between the island and the Maryland shore to maintain a free flow of water therein.

10. It is further stipulated and agreed that authorized agents and personnel of the National Park Service shall have access to the island and the right to take scientists to the island, but, in that event, the Washington Biologists' Field Club, Inc. shall not be responsible for any injuries or damages resulting to said persons due to conditions upon said island provided said injuries or damages are not caused by negligence of the Club or by a failure on the part of said Washington Biologists' Field Club, Inc. to comply with the requirements of this stipulation.
11. It is further stipulated and agreed that all rights accruing to the Washington Biologists' Field Club, Inc. or to any member thereof by reason of the provisions of this stipulation or any amendment thereto may be terminated if said Washington Biologists' Field Club, Inc. no longer exists or in the event after due written notice that the provisions of this stipulation and/or deed which will be executed following signing of this stipulation have been violated and continue to be violated by said Washington Biologists' Field Club, Inc. or its members, guests, employees, or servants for a period of time in excess of six months after receipt of said notice, and further in the event the island shall be no longer used for scientific research by the Washington Biologists' Field Club, Inc. for more than two years then this stipulation and any like provisions of the deed to be executed conveying the property to the United States shall terminate.
12. It is further stipulated and agreed that the United States may construct or permit the construction of needed nonrecreational public improvements upon the island or a portion thereof, which said improvements shall not be inconsistent with the uses to which the island has been dedicated by the Washington Biologists' Field Club, Inc.
13. It is further stipulated and agreed that this stipulation shall become effective after the filing and acceptance by the United States of a deed of conveyance containing the provisions outlined herein.

The United States of America  
By: WILLIAM E. FINLEY

*Capital Planning Commission*

*Director of the National  
Condemning Authority*



The Washington Biologists' Field Club, Inc.

By: LLOYD W. SWIFT

President

I, Albert C. Smith, certify that I am the Secretary of the corporation named as party herein; that Lloyd W. Swift, who signed this contract on behalf of the party, was then President of said corporation; that said contract was duly signed for and in behalf of said corporation by authority of its governing body, and is within the scope of its corporate powers.

ALBERT C. SMITH, *Secretary*

Appendix 3. Washington Post Article, 1959.

## ***—It's for the Birds***

Plummers Island is for the birds, and it's going to stay that way.

The National Capital Planning Commission voted yesterday to accept an offer by the Washington Biologists Field Club, Inc., to donate the Potomac island near Cabin John as part of the George Washington Memorial Parkway.

The deed will stipulate that the nature group can continue to use the island for its bird studies. The Commission will drop a condemnation suit to acquire the island, but still plans to push another suit involving Club-owned land on the Maryland shore.

**Appendix 4. Potomac Basin Reporter - 1973 Beetles and Bees & Type locality**

## Plummers Island: Unknown, But Famous in Its Way

Plummers Island, a tiny, rocky 12 acres jutting out of the Potomac River above Washington, D.C., is unknown to the general public. Among biologists, however, this spot downstream from Cabin John is one of the world's most famous spots for studying plants and animals. On any given day, a scientist probably could discover a new insect species on the Island.

Discovering new species or a preponderance of old ones has been the particular concern of members of the Washington Field Biologists Club, a professional organization of limited membership, since the turn of the Century. The Club acquired the Island in 1901 and later gave it to the National Park Service with the stipulation that members could continue research on flora and fauna. Inaccessibility and a heavy insect population at certain times of the year have made the Island undesirable to visitors – and thus preserved it, somewhat.

Members of the Club have listed more than 1,226 species of plants and 4,293 species of animals on the Island (everything from a dog to a jumping mouse or a rare bird; 1500 species of beetles alone live on Plummers, along with 300 to 400 species of bees). It is the “type-locality” for at least 175 species, meaning it is associated with the discovery of new species. No less than 16 genera and three families of plants and animals have been described on the basis of specimens collected on the Island.

Because these scientists have had unique access to specimens collected over three-quarters of a century, many comparative studies were possible. One recent study of lichens suggests that metropolitan Washington air pollution is weakening the relative immunity of certain kinds of lichen to insects, causing them to disappear.

Important news about measuring environmental changes from these and other biological indicators will be forthcoming from the Biologists Club.



## Appendix 5. Rare Plants of Plummers Island (Excerpt).

A total of 4 globally rare natural communities, two of which are state rare; 21 state-rare extant flora, including one globally rare extant species; and 36 state-rare historic flora, including 4 globally rare historic taxa are known from the island.

### Rare Flora and Natural Communities

#### Rare Natural Communities (in order of lowest to highest in elevation)

Piedmont / Central Appalachian Sand Bar / River Shore (Low Herbs Type): *Eragrostis hypnoides* - *Lindernia dubia* - *Ludwigia palustris* - *Cyperus squarrosus* Herbaceous Vegetation (USNVC: CEG006483). Non-tidal mudflats.  
Global/State Ranks: G3/SNR

Potomac Gorge Riverside Outcrop Barren (Potomac Gorge Type): (*Hypericum prolificum*, *Eubotrys racemosa*) / *Schizachyrium scoparium* - *Solidago racemosa* - *Ionactis linariifolia* Herbaceous Vegetation (USNVC: CEG006491).  
Global/State Ranks: G2/S1.

Mid-Atlantic High Terrace Hardwood Floodplain Forest: *Acer saccharum* - *Fraxinus americana* / *Carpinus caroliniana* / *Podophyllum peltatum* Forest (USNVC: CEG006459). Global/State Ranks: G3?/SNR.

Potomac River Bedrock Terrace Hardpan Forest: *Carya glabra* - *Quercus (rubra, montana)* - *Fraxinus americana* / *Viburnum rafinesqueanum* / *Piptochaetium avenaceum* Forest (USNVC: CEG006209). Global/State Ranks: G1G2/S1.

#### Rare Flora

##### Extant Flora

White Bear Sedge (*Carex albursina*) G5/S3 (last vouchered in 2004; observed by Soreng in 2020)  
Pubescent Sedge (*Carex hirtifolia*) G5/S3 (last vouchered in 1934)  
Flat-spiked Sedge (*Carex planispicata*) G4Q/S1S2 (*R.H. Simmons* 3525, 4 May 2013)  
Northern Leatherflower (*Clematis viorna*) G5/S3 (last vouchered in 1982)  
Needle-leaf Panic Grass (*Dichanthelium aciculare*) G5/S2? (*R.J. Soreng*, 8289a, 25 May 2013)  
Open-flower Panic Grass (*Dichanthelium laxiflorum*) G5/S1? (last vouchered in 1960; photographed by Simmons in 2015)  
Leatherwood (*Dirca palustris*) G4/S2 T (*R.H. Simmons* 4067, 6 Nov 2015)  
Harbinger of Spring (*Erigenia bulbosa*) G5/S3 (last vouchered in 1983; observed by Soreng in 2020)  
Halberd-leaf Rose-mallow (*Hibiscus laevis*) G5/S3 (last vouchered in 1982; photographed by Soreng in 2020)  
Green Violet (*Hybanthus concolor*) G5/S3 (last vouchered in 1960)  
Ostrich Fern (*Matteuccia struthiopteris*) G5/S2S3 (One of the largest known stands in the state. *R.H. Simmons* 3532, 5 May 2013)  
Two-flower Melic (*Melica mutica*) G5/S3 (last vouchered in 2015, *R.J. Soreng* 8340)  
Horse-tail Paspalum (*Paspalum fluitans*) G5/S2 E (*E.F. Wells* 4507, 20 Sep 1997)  
Coville's Phacelia (*Phacelia covellei*) G3/S2 E (*R.H. Simmons* 3920, 14 May 2015)  
Miami-mist (*Phacelia purshii*) G5/S3 (last vouchered in 1983; observed by Soreng on mossy rocks by plot 21 between 2013 and 2015)  
Hairy Hop-tree (*Ptelea trifoliata* var. *mollis*) G5/S3 (*R.H. Simmons* 3585, 2 Jun 2013)  
Smooth Wild-petunia (*Ruellia strepens*) G4G5/S2S3 (*R.H. Simmons* 4221, 9 Oct 2016)  
Pale Dock (*Rumex altissimus*) G5/S1 E (last vouchered in 1997)  
Sticky Goldenrod (*Solidago racemosa*) G5T3?/S1 T (photographed by Soreng in 2020)  
Pink Valerian (*Valeriana pauciflora*) G4/S1 E (last vouchered in 1982)  
Golden-alexanders (*Zizia aurea*) G5/S3 (*R.J. Soreng* 9336, 29 Apr 2017)

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### *Historic Flora*

Earleaf False Foxglove (*Agalinis auriculata*) G3/S1 E (last vouchered in 1936)  
Canada Milkvetch (*Astragalus canadensis* var. *canadensis*) G5/S1 E (last vouchered in 1940)  
Blue Wild Indigo (*Baptisia australis* var. *australis*) G5/S2 T (last seen in 1935 by Killip & Blake)  
Short's Rock Cress (*Boechea dentata*) G5/S3 (last vouchered in 1916)  
Nottoway Valley Brome Grass (*Bromus nottowanus*) G3G5/S3S4 (last vouchered in 1947)  
Hitchcock's Sedge (*Carex hitchcockiana*) G5/S1 E (last vouchered in 1933)  
Short's Sedge (*Carex shortiana*) G5/S3S4 E (last vouchered in 1928)  
Bur-reed Sedge (*Carex sparganioides*) G5/S3 (last vouchered in 1933)  
Slender Dayflower (*Commelina erecta*) G5/S3 (last vouchered in 1960)  
Spring Coralroot (*Corallorhiza wisteriana*) G5/S1 E (last vouchered in 1915)  
Smartweed Dodder (*Cuscuta polygonorum*) G5/S1 E (last vouchered in 1961)  
Many-flowered Flatsedge (*Cyperus lancastris*) G5/S2S3 (last vouchered in 1997)  
Reflexed Flatsedge (*Cyperus refractus*) G5/S2? (last vouchered in 1960)  
Dwarf Larkspur (*Delphinium tricornis*) G5/S3 (last seen in 1935 by Killip & Blake)  
Toothed Tick-trefoil (*Desmodium cuspidatum*) G5/S1 (last vouchered in 1960)  
White Trout Lily (*Erythronium albidum*) G5/S2 T (last vouchered in 1983)  
Downy Milkpea (*Galactia volubilis*) G5/S3 (last vouchered in 1961)  
Striped Gentian (*Gentiana villosa*) G4/S1 E (last vouchered in 1903)  
Western Sunflower (*Helianthus occidentalis*) G5/S1 T (last vouchered in 1940)  
Eastern Bloodleaf (*Iresine rhizomatosa*) G5/S1 E (last vouchered in 1915)  
<sup>1</sup>Violet Bush-clover (*Lespedeza frutescens*) G5/S3 (last vouchered in 1960)  
Bog Twayblade (*Liparis loeselii*) G5/S1S2 (last vouchered in 1917)  
Climbing Milkvine (*Matelea obliqua*) G4?/S1S2 E (last vouchered in 1937)  
Purple Mecardonia (*Mecardonia acuminata* var. *acuminata*) G5/S2 E (last vouchered in 1939)  
Basal Beebalm (*Monarda clinopodia*) G5/S3S4 (last vouchered in 1982)  
Early Forget-me-not (*Myosotis verna*) G5/S3 (last vouchered in 1962)  
Racemed Milkwort (*Polygala polygama*) G5/S1 T (last vouchered in 1950)  
Small Pondweed (*Potamogeton pusillus* ssp. *pusillus*) G5/S2S4 (last vouchered in 1930)  
Whorled Mountain-mint (*Pycnanthemum verticillatum*) G5/S1 E (last vouchered in 1951)  
Virginia Sida (*Ripariosida hermaphrodita*) G3/S1 E (last vouchered in 1938)  
Brown-eyed Susan (*Rudbeckia triloba*) G5/S3 (last vouchered in 1940)  
Sessile-fruited Arrowhead (*Sagittaria rigida*) G5/S1 E (last vouchered in 1930)  
Carolina Willow (*Salix caroliniana*) G5/S3 (last vouchered in 1982)  
Snowy Campion (*Silene nivea*) G4?/S1 E (last vouchered in 1917)  
Riverbank Goldenrod (*Solidago rupestris*) G4?/S1 X (last vouchered in 1903)  
Sand Grape (*Vitis rupestris*) G3/S1 (last vouchered in 1906)

<sup>1</sup>[= *Lespedeza violacea* (L.) Pers. (misapplied); “Due to a problem with the type specimen of *Lespedeza intermedia*, the name *Lespedeza violacea*, by which this species has long been known, applies to *L. intermedia*, and the name *L. frutescens* now applies to [*Lespedeza violacea*]” (VBA 2020)]

### **Key to Global Rank**

G1: At very high risk of extinction due to extreme rarity (often 5 or fewer populations), very steep declines, or other factors.  
G2: At high risk of extinction due to very restricted range, very few populations (often 20 or fewer), steep declines, or other factors.  
G3: At moderate risk of extinction due to a restricted range, relatively few populations (often 80 or fewer), recent and widespread declines, or other factors.  
G4: Uncommon but not rare; some cause for long-term concern due to declines or other factors.  
G5: Common, widespread, and abundant.

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GH: Known only from historical occurrences but still some hope of rediscovery.

GNR: Not ranked.

GX: Not located despite intensive searches and virtually no likelihood of rediscovery.

### **Key to State Rank**

S1: At very high risk of extirpation from the state due to extreme rarity (often 5 or fewer populations), very steep declines, or other factors.

S2: At high risk of extirpation from the state due to very restricted range, very few populations (often 20 or fewer), steep declines, or other factors.

S3: At moderate risk of extirpation from the state due to a restricted range, relatively few populations (often 80 or fewer), recent and widespread declines, or other factors.

S4: Uncommon but not rare; some cause for long-term concern due to declines or other factors.

S5: Common, widespread, and abundant.

SH: Known only from historical occurrences but still some hope of rediscovery.

SNR: Not ranked.

SX: Not located despite intensive searches and virtually no likelihood of rediscovery.

### **Federal and State Status**

Legal status denotes a simple hierarchy of endangerment in three categories: Endangered (E), Threatened (T), and Endangered Extirpated (X). Federal Status is determined by the U.S. Fish and Wildlife Service.

#### *Federal Status*

LE = Listed Endangered - A taxon is threatened with extinction throughout all or a significant portion of its range.

LT = Listed Threatened - A taxon is likely to become endangered in the foreseeable future.

#### *State Status*

E = Endangered - A taxon is threatened with extinction throughout all or a significant portion of its range.

T = Threatened - A taxon is likely to become endangered in the foreseeable future.

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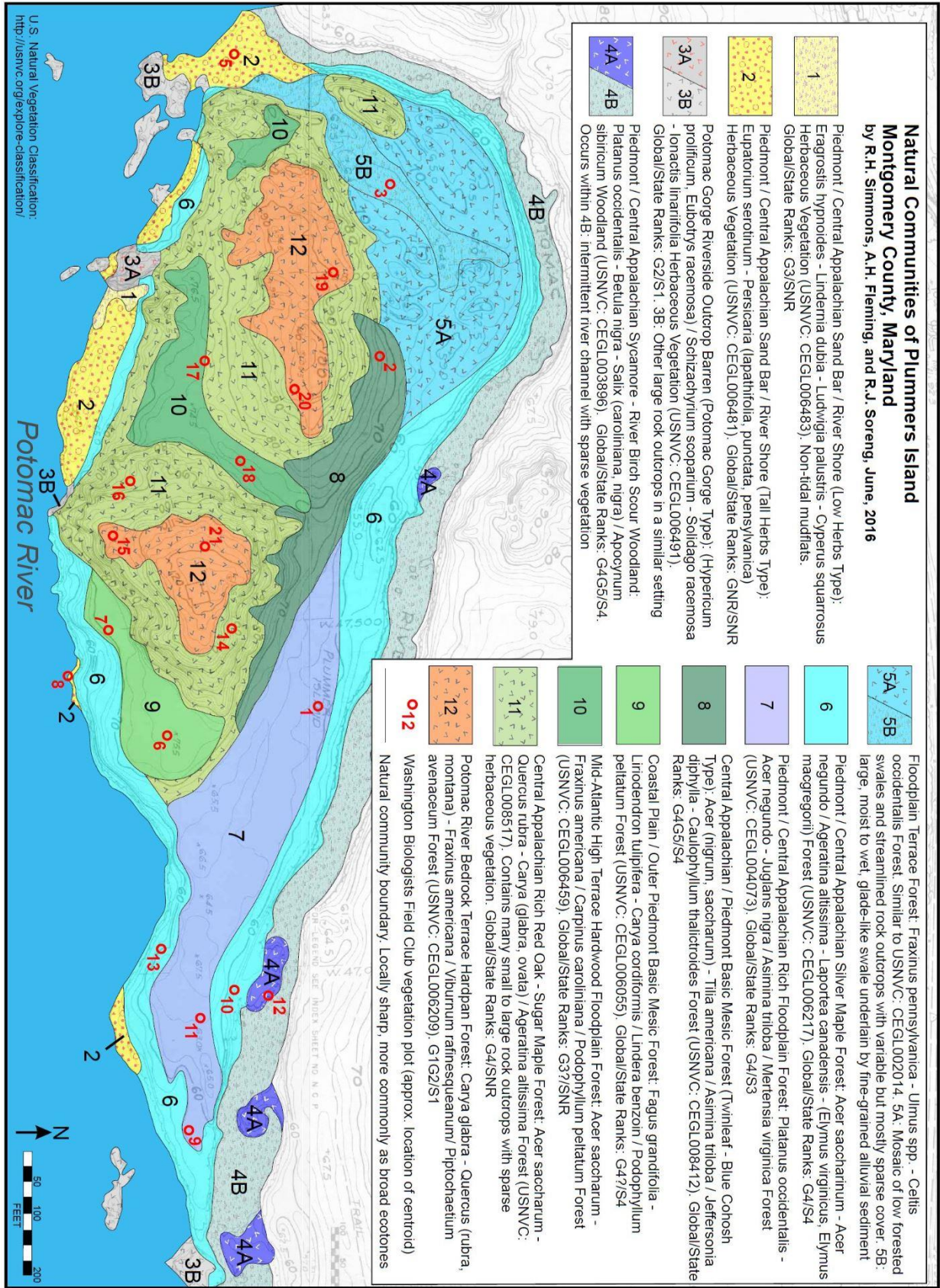
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Appendix 6. Natural Communities of Plummers Island



**Appendix 7. Titles in the *Proceedings of the Biological Society of Washington* series  
Natural History of Plummers Island, Maryland, and other key publications.**

The series “Natural History of Plummers Island, Maryland,” was published in the *Proceedings of the Biological Society of Washington* as listed below, except for XX, XXV, and XXVI, which were published elsewhere:

**I. Introduction, by William R. Maxon. Vol. 48, p. 115-117. August 22, 1935.**

**II. Flowering plants and ferns, by Ellsworth P. Killip and Sidney F. Blake. Vol. 48, pp. 118-134. August 22, 1935.**

**III. Mosses, by Emery C. Leonard. Vol. 48, pp. 135-137. August 22, 1935.**

**IV. Birds, by Albert K. Fisher, Vol. 48, pp. 159-167. November 15, 1935.**

**V. Fungi, by John A. Stevenson and Edna M. Ermold. Vol. 49, pp. 123-131. August 22, 1936.**

**VI. Reptiles and amphibians, by Maurice K. Brady. Vol. 50, pp. 137-139. September 10, 1937.**

**VII. Hepaticae, by Emory C. Leonard and M. E. Pierce. Vol. 52, pp. 21-22. March 11, 1939.**

**VIII. Lichens, by Emory C. Leonard and Ellsworth P. Killip. Vol. 52, pp. 23-26. March 11, 1939.**

**IX. Mammals, by Edward A. Goldman and Hartley H. T. Jackson. Vol. 52, pp. 131-134. October 11, 1939.**

**X. Flowering plants and ferns-Supplement 1, by Ellsworth P. Killip and Sidney F. Blake. Vol. 66, pp. 31-38. March 30, 1953.**

**XI. Blue-green algae (Myxophyceae), by Francis Drouet. Vol. 67, pp. 239-241. November 15, 1954.**

- XII. A biological note on *Trypoxylon richardsi* Sandhouse, by Karl V. Krombein. Vol. 72, pp. 101-102. July 24, 1959.**
- XIII. Descriptions of new wasps from Plummers Island, Maryland (Hymenoptera: Aculeata), by Karl V. Krombein. Vol. 75, pp. 1-17. March 30, 1962.**
- XIV. Biological notes and description of the larva and pupa of *Copelatus glypticus* (Say) (Coleoptera: Dytiscidae), by Paul J. Spangler. Vol. 75, pp. 19-23. March 30, 1962.**
- XV. Descriptions of the stages of *Chaetodactylus krombeini*, new species, a mite associated with the bee, *Osmia lignaria* Say (Acarina: Chaetodactylidae), by Edward W. Baker. Vol. 75, pp. 227-236. August 28, 1962.**
- XVI. Biological notes on *Chaetodactylus krombeini* Baker, a parasitic mite of the megachilid bee, *Osmia* (*Osmia*) *lignaria* Say (Acarina: Chaetodactylidae), by Karl V. Krombein. Vol. 75, pp. 237-249. August 28, 1962.**
- XVII. Annotated list of the wasps, by Karl V. Krombein. Vol. 76, pp. 255-280. December 31, 1963.**
- XVIII. The hibiscus wasp, an abundant rarity, and its associates (Hymenoptera: Sphecidae), by Karl V. Krombein. Vol. 77, pp. 73-112. June 26, 1964.**
- XIX. Annotated list of the aphids (Homoptera: Aphididae), by Mortimer D. Leonard. Vol. 79, pp. 117-126. May 23, 1966.**
- XX. Annotated list of the vertebrates, by Richard H. Manville, except birds by Alexander Wetmore and Manville. Special Publication, Washington Biologists' Field Club, pp. 1-44. January 1968.**
- XXI. Infestation of the lichen *Parmelia baltimorensis* Gyl. & For, by *Hypogastrura packardi* Folsom (Collembola), by Mason E. Hale, Jr. Vol. 85, pp. 287-296. August 30, 1972.**
- XXII. Biting midges (Diptera: Ceratopogonidae). 1: introduction and key to genera, by Willis W. Wirth, Nipban C. Ratanaworabhan, and Donald H. Messersmith. Vol. 90, pp. 615-647. October 17, 1977.**



- XXIII. Studies on lichen growth rate at Plummers Island, Maryland, by James D. Lawrey and Mason E. Hale, Jr. Vol. 90, pp. 698-725. October 17, 1977.**
- XXIV. Biting midges (Diptera: Ceratopogonidae). 2: the species of the tribes Heteromyiini and Sphaeromimi, by Willis W. Wirth and William L. Grogan, Jr. Vol. 91, pp. 847-903. February 23, 1979.**
- XXV. Biting midges (Diptera: Ceratopogonidae), 3: the species of the tribe Stilobezziini, by Willis W. Wirth and William L. Grogan, Jr. *Bulletin of the Biological Society of Washington* No. 5, pp. 1-102. December 9, 1981.**
- XXVI. The ground beetles of a temperate forest site (Coleoptera: Carabidae): An analysis of fauna in relation to size, habitat selection, vagility, seasonality, and extinction, by Terry L. Erwin. *Bulletin of the Biological Society of Washington* No. 5, pp. 104-224. December 9, 1981.**
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#### **SELECTED OTHER PUBLICATIONS COVERING PLUMMERS ISLAND**

**Among other publications dealing at least in part with Plummers Island or the Washington Biologists' Field Club are the following:**

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