

**Statement of Jessica Strother, Board Member, Friends of Dyke Marsh
to the Virginia Marine Resources Commission
on Application #17-0921 to Restore Dyke Marsh
March 27, 2018**

**A REVIEW OF THE ENVIRONMENTAL AND CONSERVATION BENEFITS FROM THE
PROPOSED RESTORATION OF DYKE MARSH PRESERVE, ALEXANDRIA, VIRGINIA
FOR THE VIRGINIA MARINE RESOURCES COMMISSION APPLICATION # 17-V0921**

The following points with respect to the proposed restoration of the tidal freshwater marsh - Dyke Marsh Preserve (DMP) by the National Park Service (NPS) are provided. A review of reports by the Virginia Institute of Marine Science, federal, state agencies and non-governmental organizations was conducted. Additionally, a review of some pertinent correspondence and published technical research papers and projects was done. Interviews with United States Geologic Survey and (NPS) staff, and several highly experienced field naturalists long familiar with (DMP) and northern Virginia was also conducted. I offer the following conclusions and assessments on some, and regarding the restoration proposal:

(Toxins, Heavy Metals, and Nutrients in the greater Washington, DC area of the Potomac River)

The (DMP) is located downstream of Washington, DC (WDC) and the City of Alexandria, Virginia, within Fairfax County, Virginia. It is exposed over time to some point-source and many non-point sources of water pollution from the Potomac River as well as adjacent jurisdictions. A report citing industries upstream in the (WDC) based Anacostia Watershed note the considerable presence of variety of contaminants that include mercury, copper, cadmium, arsenic, lead and others, as well as polychlorinated biphenyls (PCBs) and polycyclic aromatic hydrocarbons (PAHs). 1. Additionally, sediment loads and nutrients such as phosphorous, nitrogen, and coliform, find their way into the (DMP) through the Potomac River and adjacent streams and watercourses.

Many urban tidal freshwater marshes are found to have high and unnatural concentrations of nitrogen and phosphorous, and yet have the ability to have good mineralization rates of these nutrients. This is due to tidal effects, oxygen movement and complex soils-gas exchange. They also have helpful sediment retention functions and nutrient cycling. 1., & 2.

A 2008 study of (DMP) was conducted by the University of Maryland and the Cary Institute of Ecosystem Studies, to evaluate the influence of plant communities on denitrification. In short, this study found that (DMP) had similar rates of denitrification as other regional tidal freshwater marsh ecosystems published studies. The 2008 study also noted that the

denitrification benefits should be highly considered when restoring urban tidal freshwater wetlands. 3.

An internet review found that a variety of studies and papers addressing heavy metals uptake via phytoremediation projects throughout the United States (U.S.) and the world is significant. There are many examples of constructed wetlands serving as “cleansers” of all the pollutants previously noted. In some cases, studies have been conducted evaluating trace elements in emergent wetland plants such as cattail (*Typha*) and phragmites (*Phragmites*) species.

Page 2

Strother/Comments and Paper to Virginia Marine Resources Commission

Application #2017-V0921

February 20, 2018

Those and other plants rhizospheres and plant biomass litter deposited in these wetlands, reflect the same trace elements. 4.

One of the primary emergent wetland plants found in (DMP), the narrow-leaved cattail (*Typha angustifolia*) is well established, but significantly reduced from the historic acreage once found there. Other wetland species providing important uptake and cleansing functions of nutrients and pollutants include; pickerelweed (*Pontaderia cordata*), green arrow arum (*Peltandra virginiana*), jewelweed (*Impatiens capensis*) to name a few. These and many other plants found in (DMP) are native to this marsh, and found in the region. 5.

In sum, (DMP) is providing highly important benefits to water quality, denitrification, and likely toxin/heavy metals intake by some of the emergent plants found there. If this preserve is restored, over time these environmental benefits are expected to be notably enhanced.

(Hydrilla-SAV Issues and Management)

The submerged aquatic vegetation (SAV) invasive plant (*Hydrilla verticillata*), arrived on the Potomac River approximately 35 years ago and has become well established in more recent years. It stretches southward from the general area of the Wilson Bridge to Stafford and Spotsylvania counties that border the Potomac River. This plant was never native to northern Virginia region, (WDC) area and the Potomac River, and may have been introduced through the aquarium trade. It is listed as a federally noxious weed and is noted by the federal government as needing to be eradicated. 5, 6, 7 It is found mostly adjacent to and within a small portion of (DMP). The vast majority of (SAV) that is adjacent to, and within a small portion of (DMP), is hydrilla. This was not the case 25 years ago and especially prior, as the Potomac River and (DMP) had a number of native (SAV) species within it. 5.

Hydrilla serves as an occasional feeding mat for migrating shorebirds .8, and cover for fish, however, it has some notable drawbacks. In addition to affecting recreational boaters and those attempting to fish, approximately during one-half of a given year, hydrilla dies back in late

fall and winter. At that time hydrilla releases some of the pollutants it has trapped and creates a negative impact on oxygen levels in the river. 12. Hydrilla is also an aggressive plant that prevents native (SAV) from becoming established in various aquatic ecosystems and the Potomac River. 5. & 7., 12.

Recently, research has been conducted and confirmed that hydrilla can harbor an associated epiphytic cyanobacterium disease, known as avian vacuolar myelinopathy (AVM).

Page 3

Strother/Comments and Paper to Virginia Marine Resources Commission

Application # 2017-V0921

February 20, 2018

This fatal disease is transmitted to herbivorous waterbirds feeding on hydrilla and or in close proximity to it.

Avian predators are known to then pick up this fatal disease from waterbirds they may feed on. (AVM) has killed numerous birds throughout the southeastern (U.S.). It is unknown if this disease has affected the hydrilla in the Potomac River. 7.

It is my understanding that once the restoration of the (DMP) is complete, there will be more than three times the hydrilla habitat and eventual hydrilla acreage created than currently exists today. There are a number of on-going projects to re-establish "native" (SAV) in the Potomac, which could be successful over time, if the hydrilla is either eradicated or substantially controlled.

In sum, hydrilla is a highly invasive non-native that is not substantively contributing to the Potomac River and (DMP) ecosystems, and can impede the re-establishment of native (SAV). There is concern through research that hydrilla may harbor the (AVM) disease, which could kill waterfowl, shorebirds and their avian predators. Over time, this disease has the potential to show up in the upper Potomac River and the (DMP) area and beyond.

(Stewardship and Protection- Fauna and Flora of DMP and Adjacent Potomac River)

There is a wide variety of fauna and flora species in (DMP). The following is a review and discussion of some of these species that are threatened, imperiled, or are of notable concern.

FISH: In recent years 37 species of fish have been found in (DMP) and the adjacent Potomac River. A number of anadromous fish such as American shad, blueback herring, alewife, white perch and striped bass use the Potomac River for spawning. Tidal freshwater wetlands are known to be critical habitat for these anadromous fish species, particularly striped bass and American shad. 5. Emergent wetlands are important nurseries for fish and the habitat they

need for cover and foraging. Emergent wetlands provide food and habitat for adult and juvenile fish, as well as provide important cover from predators.

The proposed breakwater – a component of the (DMP) restoration, among other design aspects, will also attract juvenile fish seeking protection. 5. Various types of structures natural and man-made, such as the proposed breakwater are a well-known type of habitat enhancement for fish. The fisheries profession as well as commercial interests- welcome and encourage the placement of various structures in aquatic environments that include large trees, stone jetties, block walls, and coir logs placed together, to provide cover and attract fish.

Page 4

Strother/Comments and Paper to the Virginia Marine Resources Commission

Application # 2017-V0921

February 20, 2018

In sum, restoration of (DMP) emergent wetlands over time, will contribute to enhancing and improving fish habitat, as well as habitat for a variety of other aquatic and terrestrial species. The proposed breakwater should contribute to this. **Additional benefits would include more opportunities for better quality recreational fishing, as well.

SOME INVERTEBRATES: In 2016-2017 a group of field naturalists began a survey of the butterflies, (*Lepidoptera*) and damselflies and dragonflies (*Odonata*) found in (DMP). The continuing goal is to establish a base line data list of species and abundance, for future management considerations, and interpretive programs for the public. The primary focus is to document the number of species seen, and numbers in each category of species. Approximately one-third of the (DMP) is accessed, one to two times a month for six months each year. Given the loss and impairment of local habitat, and the loss of tidal and some upland marsh at (DMP), the data suggests so far, that a moderate number of species have been seen, but the abundance of each may be low. Additionally, three species of dragonfly (*Odonata*) that should have been observed at (DMP) or in nearby similar habitat have not been observed since 2002. 9. Overall, the impacts to the marsh area of (DMP) reflect what is going on regionally with this fauna; loss of habitat affecting probable abundance of the given species in each category. 9.

VEGETATION: (DMP) contains a number of wetland plant species that are either threatened or critically imperiled in Virginia; Davis's sedge (*Carex davisii*), river bulrush (*Bolboschoenus/Schoenoplectus fluviatilis*), and rough avens (*Geum lacinatum*). Giant Bur-reed (*Sparganium eurycarpum*) also found in (DMP), has soil binding characteristics that are helpful in mitigating erosion. 2., 5.

In sum, these species along with many others found in the tidal and upland emergent wetland in DMP provide important water quality, buffering, and faunal habitat that should be

protected for the array of benefits they provide. Tidal wetland marshes are among the most productive emergent wetland community types on the east coast. 2.

BIRDS: Migratory and resident bird species in and around (DMP) is significant. The Virginia Society of Ornithology (VSO) states that (DMP) supports 270 species of birds. A winter waterfowl count in 2017 in and around (DMP) yielded 11 species of wintering and resident waterfowl. Several species of birds that have been known to nest in DMP and that have habitat restrictions for breeding, include the American bittern (*Botarus lentiginosus*) and the coastal plain swamp sparrow (*Melospiza georgiana nigrescens*). 10.

Page 5

Strother/Comments and Paper to Virginia Marine Resources Commission

Application # 2017-V0921

February 20, 2018

Historically, (DMP) hosted only one- two known nesting populations of the marsh wren (MW) (*Cistothorus palustris*) in the upper Potomac River tidal zone. In 1950, surveyors counted 87 singing, (MW) males. 10. Since 2015, no active nests or observations of females have been documented in (DMP). 8. One of a variety of possible causes for the disappearance of the (MW) is the greatly reduced historic acreage of narrow-leaved cattail in DMP, the bird's preferred habitat. Additionally, erosion of the marsh may have reduced or eliminated the (MW's) prey base. 8. Currently, the Least bittern (*Ixobrychus exilis*) a previously common breeder in (DMP), has been observed infrequently in recent years. It is listed as vulnerable and on a watchlist. 5.

In 1961, the regional Audubon Naturalist Society of the Central Atlantic States, published a Field List of Birds of the District of Columbia Region. A number of the country's most esteemed biologists and ornithologists including Roger Tory Peterson, Chandler S. Robbins, J.J. Murray, Jackson M. Abbott, among others, including the (VSO), contributed to this document. For the (DMP) section in the publication it states " Downstream from Belle Haven, is the last of the great river marshes left near Washington. Hundreds of Long-billed marsh wrens nest here, with equally common red-winged blackbirds, and many least bitterns and king rails". 11.

(Summary and Conclusions)

The (DMP) as stated, is very worthy of being preserved and restored for all the benefits it provides to the larger overall marsh, and the health of Potomac River ecosystem. The stewardship and restoration of the flora and fauna, including the local fisheries is at a "last stand moment" today. The public and residents of the region will benefit from the proposed restoration, through improved water quality that can ensure human health, better quality fishing opportunities, recreational boating, and nature study.

The emphasis and recommendations to preserve invasive hydrilla by some, is very overstated. Additionally, there is an oversight in acknowledging the important ecosystem functions provided by native, emergent tidal wetland marshes.

This ecosystem-wetland marsh, very uncommon in the upper Potomac River, is in desperate need of restoration, conservation work and stewardship.

Strother/2-2018

References and Citations – Next- Page 6

1. Anacostia River Watershed Restoration Plan and Report. February 2010 Final Draft, Chapters 2,3,4. Council of Governments, State of Maryland, District of Columbia, Army Corps of Eng.
2. VHB Consultants Inc , Paper; Functions of Mid-Atlantic Tidal Freshwater Marshes: A Summary. Tysons Corner, Virginia
3. Hofensberger, K.N. and S.S. Kaushal, S. Findlay, J.C. Cornwell. 2009. Influence of Plant Communities on Denitrification in a Tidal Freshwater Marsh of the Potomac River, United States. University of Maryland and Cary Institute of Ecosystem Studies. Journal of Environmental Quality 38:618-626
4. Mallin, M., Bongkeun Song, Andrew Long, Mathew McIver, 2012, University of North Carolina, Wilmington, Center for Marine Science, Dave Mayes, Wilmington Stormwater Services. High Pollutant Removal in a Large Constructed Wetland Improves a Tidal Creek, On-line Presentation.
5. National Park Service, U.S. Department of the Interior, George Washington Memorial Parkway, Turkey Run, Virginia. January 2014. Dyke Marsh Wetland-Restoration and Long-Term Management Plan/Draft Environmental Impact Statement.
6. National Agriculture Library, U.S. Department of Agriculture Aquatic Species, National Invasive Species Information- Web Site
7. Correspondence/Memorandum to Commander U.S. Army Corps of Engineers, Baltimore District, Maryland: January 17, 2018. From Linda S. Nelson, Ph.D Department of the Army, Army Corps of Engineers, Vicksburg, Mississippi. Comments on Proposed Dyke Marsh Wetland Restoration Project.
8. Personal Communication: Larry Cartwright, Compiler. Dyke Marsh Breeding Bird Survey Coordinator, 1984 to current.
9. Personal Communication: James Waggoner, Compiler; Dyke Marsh Lepidoptera/Odonata Survey, 2016 to current. Compiler; Potomac River Valley Regional Public Lands Survey, Fairfax and Prince William Counties, Lepidoptera/Odonata Surveys. 1987 to current.

10. Virginia Society of Ornithology. Board of Officers and Directors. December 1, 2018
Correspondence to the Virginia Marine Resources Commission- Dyke Marsh Restoration
Proposal.

11. Audubon Naturalist Society of the Central Atlantic States, Inc. 1961. Field List of Birds of the
District of Columbia Region, Washington, D.C.

12. Virginia Department of Conservation and Recreation, Natural Heritage Program, Invasive
Plants in Virginia, Fact Sheet on Hydrilla. www.dcr.virginia.gov/natural-heritage