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Final Document

Comments on DNR Proposal for Pilot Project on Limited Control of Eurasian Watermilfoil in Deep Creek Lake

Background:

Eurasian Watermilfoil (EWM) [*Myriophyllum spicatum*] is an invasive of submerged aquatic vegetation (SAV) native to Europe, Asia, and Africa. The species was reportedly found in the Chesapeake Bay in the 1880's and was collected and identified in the District of Columbia in 1942. Since that time, it spread primarily along the eastern seaboard states and currently is recognized as a component of SAV in freshwater lakes and both Atlantic and Pacific Ocean bays throughout the United States. Surveys of the SAV populations in Deep Creek Lake (DCL) for the past several years by the Department of Natural Resources (DNR) have established the presence of EWM in DCL. The January 25, 2013 Proposal for a Pilot Control Study was drafted by DNR in an effort to meet public concerns about the presence and potential threat of this invasive SAV on the DCL ecosystem. This document responds to the request of DNR for public comments on their Pilot Control Project.

EWM as an Invasive Species:

EWM is characterized as an invasive species because originally it was not native to North America. Invasive species of both SAV and land plants are considered to be dangerous or problems because invasive plants have no known biological controls that limit growth and spread; hence, they are opportunistic in that they may supplant native species that occupy suitable ecological sites. Indeed, during the late 1950's thick mats of EWM in Chesapeake Bay were widespread covering thousands of acres. The large beds died out in the mid-1970's and EWM has continued to be present in lesser quantities. [Note: A fungal plant disease was found on the EWM at that time and was thought to be a potential biological control method by the U.S. Corps of Army of Engineers. However, it was not found to be effective control measure]. In the past several decades, large blooms of mat and beds have been reported from major recreational lakes in several states [e.g., Black Lake, New York in 2007-2008]. A number of research organizations as well as Federal and State agencies have conducted extensive studies and efforts to control the growth and spread of EWM. It is evident that DNR is well aware of the history and potential problems with EWM as an invasive species.

While EWM does reproduce sexually and produces viable seed from flowers, the plant spreads primarily by fragmentation of the stems. Each fragment is capable forming new plants. However, other species of Myriophyllum have the same capability to an equal or similar but lesser extent depending on growing conditions, nutrient availability, water flow and vegetation disturbance by not only natural sources such as wind and waves but also by human activities such as swimming,

paddling, and especially by motor boat passage. Thus, there is adequate reason to be concerned about EWM as an invasive species on the DCL SAV community.

SAV in DCL:

In 2010 in response to concerns about SAV beds in shallow areas of DCL during the late summer and the impact of fluctuating water levels on SAV possible interference with recreation and boating, DNR initiated a survey of SAV populations in DCL. Annual summer surveys were conducted in 2010, 2011, 2012, and will be continued in 2013. Details and results of these surveys can be found in DNR reports dated October 14, 2011 and December, 2012. Briefly, these reports document the presence or absence of Myriophyllum spp. and other SAV species at six sites throughout DCL. Sixteen species of vascular plants and two genera of macroalgae were found as dominant plants in the SAV communities during each survey. The 2012 December Report states "*The majority of observed species, as well as the physical characteristics of each survey site, showed no significant change in density or distribution from 2010 to 2012*." Myriophyllum spp. were most prevalent at the HoniHoni and Red Run sites in each year. Both sites are somewhat unique because water inflow at both is minimal compared to the other sites. The 2012 survey was expanded to include collection of shoreline Myriophyllum spp. and EWM (*M.spicatum*) was identified as a component of this part of the survey.

It is important to recognize that several Myriophyllum spp. exist in DCL. These include the native species, *M. sibiricum* and *M. heterophyllum.* Definitive identification of Myriophyllum spp. is difficult because the morphological characteristics upon which species determination are made are minor morphological differences. Further, hybridization of *M. sibiricum* and *M.heterophyllum* has been reported. While no citations to hybridization of *M. spicatum* with closely related species have been found, the possibility of its hybridization with closely related species in the same ecological niche is a well recognized biological phenomenon.

EWM in DCL:

DNR survey data collected thus far (three years) indicate the EWM is present in DCL to a limited extent but there is scant evidence that EWM has thus far overgrown or supplanted other SAV species including the native Myriophyllum spp. found in DCL. Further, inasmuch as surveys of DCL SAV have only been conducted since 2010, there is insufficient data to determine exactly when EWM was introduced to DCL. Available data indicate that EWM was present in Chesapeake Bay in 1924 and logic suggests that transfer by fragments of EWM on watercraft must have occurred more than once during the intervening 86 years. The fact that EWM exists with native Myriophyllum spp. and as yet, has not become the single dominant species suggests that these species probably coexist in a favorable ecological niche. [While unrelated to the issue of SAV and EWM, biologically speaking, one should recognize that Malus spp. (apples, etc.] are native to Central Asia and were thus technically, an invasive species in North America introduced about 350 or so years ago. Yet today, apple trees and related species

are considered as native because they have not overtaken or outcompeted native plants throughout North America].

Proposed Pilot Project:

The DNR pilot project suggests the limited trial of a formulation of 2, 4-D to evaluate its possible effectiveness in control of EWM. However, 2, 4-D has been used extensively in many trials and has been found to reduce populations of several vascular SAV species. The herbicide affects primarily dicotyledonous vascular plants and has little or no affect on monocotolydenous vascular plants. Its ability to reduce SAV populations of Myriophyllum spp. including EWM is well known but it also is equally effective in reducing populations of Arrowhead (*Sagittaria cristata*), Coontail (*Ceratophyllum demersum*), and Bladderwort (*Utricularia vulgaris*) but has little or no effect on other SAV such as Wild celery (*Vallisneria americana*), Canadian waterweed (*Elodea canadensis*), Pondweeds (several species of *Potamogeton*), and naiads (*Naiad* spp.). If the populations of the four currently dominant susceptible SAV are reduced by the application of 2, 4-D, the growth and distribution of the other nine SAV species might increase significantly as competition for soil, light, etc. would be lessened.

The draft of the pilot project clearly identifies the potential risks of using 2, 4-D to control EWM [see page 2 of the draft]. Taken together, these five points document the risk that herbicidal treatments can cause shifts in SAV plant community species distribution and density. Both native and invasive species unaffected by the herbicidal treatment would colonize the area where EWM populations were reduced. The available control literature is replete with examples of the increased growth and distribution of competing SAV species and the necessity for multiyear applications for measurable SAV control.

DNR has provided additional details of the positive and negative consequences of both a trial with 2, 4-D and potential for the other options in addressing limited control of EWM and SAV. The description of the approach to the proposed pilot project raises additional questions that transcend the biological aspects of undertaking a limited trial of herbicide treatment. For example:

1. The project would need to be supported by the DCL property owners and stakeholders. It is unclear as to how this support would be determined in an open and publicly evident manner.
2. The proposed trial would be in May 2013. This is the appropriate time from a SAV control point of view.
3. The proposal calls for application to a 2-3 acre area. While the statistical power is limited, it would be more useful to identify two areas with similar depth and physical attributes as well as similar SAV populations of like density and distribution. One would be treated and the other untreated. In this manner, follow up surveys could provide more definitive data on herbicide effects. Obviously, this is more costly but would improve the scientific rigor of the effort.
4. DNR is correct in that rigorous pre- and post-treatment monitoring is necessary. Based on previous trials, effects on wildlife, fish, and humans would be expected to be minimal assuming that the dosage is appropriate (as described by DNR in the draft proposal) and the

weather conditions optimal. The trial will require the commitment of fiscal resources to extensive pre- and post- treatment monitoring. Such resources should not compromise the continuation of annual SAV and water quality surveys throughout DCL. More importantly, a major unknown is the public's response to knowledge of a known pesticide being used in DCL. 5. As noted above and detailed on page 2 of the proposal, the possible negative consequences from the trial have considerable potential to create additional problems with EWM and SAV.

Conclusions:

DNR stated in the draft of the Pilot Project: *"DNR's SAV surveys indicate that EWM is not dominating or out competing native SAV species in DCL at this time"*. The critical wording is *"at this time"*. The three years data collected thus far since 2010 do not establish a time trend that identifies EWM is dominating and supplanting the native Myriophyllum and other SAV species present in DCL. Additional annual surveys of DCL SAV populations are needed to firmly establish whether EWM is an aggressive invasive or not.

More importantly, the three years data on occurrence of SAV in DCL confirm studies of other freshwater lakes that show healthy populations of SAV have beneficial effects on freshwater ecosystems. But within DCL, problems are evident in selected shallow areas and coves where varying water levels result in dense beds of SAV, especially in late summers when inadequate rainfall occurs and water level is drawn down. These negative potential from SAV in respect to current and future impacts on the ecology of the lake and the economic and cultural importance of the DCL watershed requires additional attention and commitment of resources. Indeed, the issue of SAV beds in localized areas of DCL may be more critical than the impact of EWM. Based on these projections, the need for a pilot project for limited chemical control of EWM at this time appears secondary.

Both SAV growth and distribution and limiting invasiveness of EWM are complex issues. Approaches to management and possible control measures are limited by many questions, inadequate data, and few answers. At present, benthic mats are being used for partial control of both in limited areas. Such measures are expensive. Experience elsewhere suggests that chemical control of benthic SAV beds appears to be the next most reasonable approach. The weight of evidence from studies of SAV and existence of EWM in DCL to date suggest that additional data is needed to establish if and when EWM will overrun the native SAV species of the lake.

The use of chemical control measures such as 2, 4-D even in a limited trial appears to be a short-sighted approach to a limited problem that will require additional resources that might better be focused on the wider issues of both the SAV positive and negative impacts on portions of DCL. For these reasons, the proposed small trial of chemical control focused on EWM in 2013 is not warranted at this time.

Recommendations:

Continued and possibly extended and/or expanded annual surveys appear to be the most cost effective approach to management of the SAV communities present in DCL. In view of the inadequacy of current data and the availability of limited funds for the foreseeable future, continued monitoring of known SAV sites and possibly additional sites should be continued for additional years.

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Dr. Fisher graduated from the University of Vermont with a B.S. (1953) and M.S. (1955) in Botany. After service in the U.S. Army Medical Service Corps, he received a Ph.D. in Plant Pathology from North Carolina State University in 1960. From 1960 to 1963, Ken was on the faculty of South Dakota State University doing research and extension work on soil borne plant diseases. In 1963, he moved to the University of Vermont where he taught microbiology and conducted studies on control of soil and water borne plant pathogens. He spent the next 27 years conducting reviews and analyses of biological and medical research in the private and public sector. He continued his interests in botany and microbiology teaching at Montgomery College from 1969 to 1985. Following retirement in 1994, he served as a consultant for several Federal agencies evaluating research proposals and programs. Currently he is a member of the Maryland Native Plant Society and the Society of Sigma Xi and serves as a member of the Garrett County Forestry Board.

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