Public Input on General Electric's June 8, 2023 Vernal Pools Pilot Study Work Plan

August 2023

MASSWILDLIFE

DIVISION OF
FISHERIES & WILDLIFE

1 Rabbit Hill Road, Westborough, MA 01581
p: (508) 389-6300 | f: (508) 389-7890
MASS.GOV/MASSWILDLIFE

August 3, 2023

Christopher Smith
EPA New England, Region I
Federal Facilities & Housatonic River Section
Superfund and Emergency Management Division
5 Post Office Square
Boston, MA 02109-3912

Re: GE-Pittsfield/Housatonic River Site
Rest of River (GECD850)
Vernal Pool Pilot Study Work Plan

Dear Chris,

Thank you for the opportunity to review and comment on General Electric Company's initial *Vernal Pool Pilot Study Work Plan* (hereinafter "the *Plan*"), prepared in June 2023 by Anchor QEA, LLC in conjunction with AECOM. Staff of the Natural Heritage & Endangered Species Program (NHESP) of the Massachusetts Division of Fisheries and Wildlife (Division) have reviewed the *Plan* and prepared the following comments.

Given certain constraints (e.g., timeline for remediation benchmarks, study pool sample size), the NHESP believes the study design of the *Plan* is generally well developed and provides a logical and reasonable approach to identifying a preferred treatment strategy for remediation of polychlorinated biphenyl (PCB) contamination in vernal pools of the Housatonic River Site. In particular, the NHESP approves of using bench-scale testing and baseline monitoring to help inform development of treatment parameters for the final work plan of the pilot study.

In anticipation of an eventual revised plan for further review, the NHESP respectfully offers for your consideration the following comments and questions regarding specific aspects of the *Plan*.

<u>Minor Comments</u>

(1) **Page 19, Paragraph 1:** The obligate pool-breeding amphibian breeding season in the Housatonic River Valley region of Massachusetts may begin as early as mid-March. Although Wood Frog tadpoles typically reach metamorphosis in mid- to late June, Spotted Salamander larvae tend not to do so until mid- to late July at the earliest. Therefore, in describing the typical time period of the breeding cycle for these two species in Massachusetts, it would be more accurate and inclusive to note the period as mid-March through July (rather than April through June). Similarly, quantification of the breeding cycle in number of days might be done more accurately by noting "75 to 150 days" (rather than 60 to 90). Wood Frogs in Massachusetts can develop from egg to froglet in 60 days under certain circumstances, but 75 to 90 days is more typical.

(2) **Pages 26–27, Table 3-1:** Section 3.3.1 does not appear to address why PAC is proposed to be tested at doses of 1%, 2%, and 5% while GAC is proposed to be tested only at doses of 2% and

5%. Why would GAC not be tested at the 1% dose level? It could be helpful to either test at that dose or else provide a rationale in the revised plan for not testing at that dose.

(3) **Page 29, Paragraph 2 (Section 4.1 – Baseline Monitoring and Survey):** This section notes that only ecological monitoring will be performed in the control pools. If soil sampling, pore water sampling, and bathymetric surveying are proposed for treatment pools, should they not also be implemented at control pools to help quantify natural variation in those parameters? This might be especially relevant in the context that vernal pools occurring in river floodplains may be more prone to soil disturbance (e.g., scour from flowing floodwater) than the average woodland vernal pool. We recommend that the revised plan include a rationale for excluding soil sampling, pore water sampling, and/or bathymetric surveying at control pools, should there be a final decision to exclude them.

(4) **Page 34, Paragraph 3:** The second sentence of the paragraph notes that screening for presence of state-listed species will be performed during the site preparation phase. We recommend that the revised plan include both a description of what "screening" entails and a description of what will be done (or not done) if a state-listed species is detected. For example, if a detected state-listed species is to be protected from specific harm, an agreed-upon protocol should be in place. We also request that any occurrence of state-listed species will be reported to the NHESP via its online portal "Heritage Hub" (https://www.mass.gov/info-details/heritage-hub-overview).

(5) **Page 35, Paragraph 4:** The last sentence notes that no additional soil PCB sample collection and analysis will be performed in the pilot study pools subject to the removal treatment. We recommend that the revised plan provide an explicit rationale for that. If there is an assumption (or it is already established) that PCBs cannot or will not contaminate backfill soils (e.g., via floodwater that has significantly disturbed soils upriver, or via upward migration of PCBs in potentially contaminated soils beneath the backfill), it might be helpful to include such information in the revised plan.

Major Comments

(1) **Amended Cover Placement (Thick Layer):** Although the NHESP does not object to bench-scale testing of the "amended cover" application methodology (e.g., Section 3.3.2 of the *Plan*) to aid in interpretation and comparison of results among tested methodologies in general, we are not likely to support prospective use of the amended cover methodology at relatively shallow pools when it comes time to implement treatment applications in the field. In shallow pools, addition of a thick layer could result in substantial negative impacts to pool hydrology and function as they relate to amphibian reproduction. A primary concern is that such an application, if representing a significant proportion of a basin's existing depth, could result in a biologically meaningful decrease in water depth during the breeding cycle of obligate pool-breeding species (e.g., Wood Frog, Spotted Salamander). Such a decrease could consequently lead to higher water temperature and decreased hydroperiod. Decreased hydroperiod could result in exposure of egg masses prior to hatching or in complete drying of the pool before amphibian larvae can complete metamorphosis.

(2) **Baseline and Post-Remediation Monitoring of Egg Masses**: The *Plan* indicates that surveys to monitor counts of amphibian egg masses will be conducted at the 10 test pools and 7 control pools of the pilot study prior to and following remediation, but the *Plan* does not seem to describe the specific purpose(s) of those surveys. Pre- and post-remediation egg-mass counts

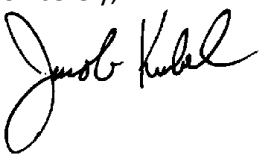
could be one means of detecting potential changes in habitat quality attributable to remediation work and, depending on length of the monitoring period, could be used to help identify how local amphibian populations are affected by remediation. The *Plan* proposes a post-remediation monitoring period of 3 years, which is probably sufficient to determine whether a change in habitat quality is influencing the ability of existing amphibian populations to breed and deposit eggs in a given pool. However, a post-remediation monitoring period of 3 years is probably not sufficient to determine whether a change in habitat quality is influencing reproductive success and/or recruitment (i.e., larval survival to metamorphosis, fitness of metamorphs prior to dispersal from natal pools) and, therefore, population size.

Female Wood Frogs can take 2–3 years to reach sexual maturity, and female Spotted Salamanders at northern latitudes tend not to reach sexual maturity until they are several years old (range 3–7 years). Therefore, if remediation influences amphibian reproductive success and/or recruitment, there could be a significant lag between the remediation action and a corresponding change in size of the adult population (as estimated via egg-mass abundance). If remediation were to have a positive or negative impact on reproductive success and/or recruitment, a corresponding change in egg-mass abundance might (but not necessarily) be detectable by Year 3 in the local Wood Frog population, but not in the local Spotted Salamander population. If egg-mass counts are to be used to help analyze or interpret the potential influence of remediation strategies on pool-breeding amphibian population size, we recommend a post-treatment monitoring period of at least 5 years for Wood Frog and 7–10 years for Spotted Salamander (if that latter species is to be included in the analysis).

Lastly, Section 4.1.2, Section 4.1.3, and Appendix E of the *Plan* describe the proposed methodology for baseline and post-treatment ecological surveys. The *Plan* indicates that amphibian egg-mass counts will be one of the ecological parameters evaluated, but it does not seem to include a specific methodology or procedure for conducting the egg-mass surveys. We recommend that the revised plan include such a methodology, and we can be available to consult on its development. Of course, we'll also understand if there is a specific need to implement the same methodology that was used to survey pools during the Potential Vernal Pool Investigations by AECOM several years ago.

Thank you again for the opportunity to comment on the *Plan*, and we hope that you find our suggestions helpful. We look forward to engaging with you in further review and discussion as needed.

Sincerely,



Jacob E. Kubel
Conservation Scientist, NHESP

Cc (via e-mail): Everose Schlüter, Ph.D., Assistant Director
Michael T. Jones, Ph.D., State Herpetologist

Mass Audubon

August 14, 2023

Christopher Smith
EPA New England, Region I
Federal Facilities & Housatonic River Section
Superfund and Emergency Management Division
5 Post Office Square
Boston, MA 02109-3912

Via Email: 1Housatonic@epa.gov and smith.christopher@epa.gov

Re: **GE-Pittsfield/Housatonic River Site Rest of River (GECD850) Vernal Pool Pilot Study Work Plan**

Dear Mr. Smith:

On behalf of Mass Audubon, I submit the following comments on the proposed work plan for the Vernal Pool Pilot Study for the Housatonic PCB remediation project. As noted in our previous comments on this project, Mass Audubon is both a directly affected landowner - at our Canoe Meadows Wildlife Sanctuary in Reach 5A of the Rest of River area - and as a statewide conservation organization, we have a broader interest in the conservation and restoration of the Housatonic River Valley ecosystem for the benefit of both people and wildlife.

Mass Audubon's Senior Conservation Ecologist for our Central/West Region, Tom Lautzenheiser, reviewed the document and provided the following comments and suggestions for refinement of the final Work Plan.

Vernal pools are particularly important habitat features supporting biodiversity within the PCB cleanup area. Remediating soils within the vernal pools will significantly alter these habitats, but is necessary since the levels of PCBs present poses threats to ecological health over long periods of time.

The purpose of the pilot study is to evaluate the effectiveness of traditional sediment/soil excavation/backfill-based techniques as well as soil amendment-based techniques (including activated carbon) for the remediation of PCB-contaminated vernal pools in the floodplain of the Housatonic River. Ten vernal pools in the project area (out of 60) were selected for inclusion in the study based on various criteria, including spatially weighted average PCB concentrations and pool size, accessibility, vegetative cover, wildlife community composition, hydrology, and surrounding cover types. Seven additional pools were selected as field controls to be monitored for changes unrelated to remediation treatments. Importantly, the pilot study includes bench-scale tests to refine amendment-based treatment approaches, and proposes physical, chemical, and ecological performance criteria and monitoring to determine success. Additional study refinement is anticipated following the completion of bench-scale testing and baseline (pre-remediation) monitoring. Overall, the Pilot Study Work Plan presents a reasonable and practicable approach to gaining necessary experience and perspective on remediating vernal pools in the Housatonic floodplain.

Due to pool-to-pool and year-to-year variability, vernal pools are a challenging subject for a controlled study that includes dramatic site alterations as part of the treatment groups. As proposed, treatment groups include five pools each, to be compared to the seven-pool control group. The scale of this field-based remediation activity seems generally appropriate for a pilot study, but results probably should be considered as anecdotal guidance rather than statistically rigorous conclusions. A potential (and ideal, if attained) outcome may be results that are strong enough to form the basis for an approach that provides positive results for both PCB remediation and ecological functionality. The outcome of the study will need to be evaluated to determine whether or not that is the case. One study design refinement we suggest is to add three additional pools to the control group to match the total number of treatment pools, and to better reflect the range of PCB concentrations represented in the treatment pools.

Another complication in assessing proposed treatments is that areas around the vernal pools—potentially 300 feet away or more—provide critical non-breeding habitat for many vernal pool-related organisms. Populations of obligate wood frogs and mole salamanders, as well as those of various facultative vernal pool amphibians, will likely benefit from treatments that reduce bioavailability of PCBs within vernal pools, yet those populations could be harmed by subsequent nearby floodplain remediation. This complication should not be a reason to curtail remediation activities, but it encourages thoughtful project design and phasing, to reduce the environmental PCB load while maintaining vernal pool ecosystem function. It is important to maintain connectivity between the vernal pool and upland habitat of vernal pool species. While it would substantially expand the scope of this pilot study, an assessment of remediation's effects on adjacent non-breeding habitat of obligate vernal pool amphibians could be considered.

Proposed biological monitoring includes egg mass and fairy shrimp surveys to document the presence of obligate vernal pool organisms. This monitoring component aligns with the elements of the state Natural Heritage and Endangered Species Program's (NHESP's) criteria for vernal pool certification (e.g., total of five egg masses of any combination of obligate species; one egg mass of a state-listed species; presence of adult fairy shrimp). These surveys are appropriate and possibly sufficient, though broadening the protocol to include additional macroinvertebrates may be useful to document the recovery of a pool's ecological community following remediation. The assortment of macroinvertebrates that can be found in any individual vernal pool varies considerably pool to pool, but caddisflies (Order Trichoptera), particularly "log cabin" caddisflies in the genus *Limnephilus* (and a few other genera) are present in most. Caddisfly occurrence/abundance could potentially be another indicator of remediation success in many pools.

Thank you for the opportunity to review this draft study work plan, and for your consideration of these comments.

Regards,

Stephen Hutchinson
Senior Regional Director
Mass Audubon
shutchinson@massaudubon.org

August 13, 2023

Mr. Christopher Smith
EPA Project Manager
U.S. Environmental Protection Agency
New England Region
Five Post Office Square, Suite 100
Boston, MA 02109

Via email: R1Housatonic@epa.gov

Re: GE-Pittsfield/Housatonic River Site Rest of River (GECD850)
Vernal Pool Pilot Study Work Plan

Dear Christopher Smith,

Please accept the following comments from the Vernal Pool Pilot Study Working Group.

We are very concerned about the use of Activated Carbon to “remediate” the vernal pools. Adding Activated Carbon or biochar to a vernal pool does not get rid of the PCBs. Over time, carbon may release the PCBs back into the environment.

Before applying Activated Carbon or biochar to any of the vernal pools, many questions need to be answered.

What evidence is there that Activated Carbon does decrease the bioavailability of PCBs in a vernal pool system?

Is pore water a good indicator of bioavailability in this system?

Does Activated Carbon harm life in vernal pools? Studies indicate that invertebrates have elevated mortality when charcoal is added to the substrate. Body lipids can be reduced by as much as 50% in essence starving these animals. Whatever the carbon is doing to bind toxics may also be binding nutrients. This would make it appear that the Activated Carbon is being consumed, thus calling into question the assumption that Activated Carbon makes PCBs less bioavailable.

Does Activated Carbon change the pH? It appears that Activated Carbon may also have some effect on pH which could affect the mobilization of nutrients and could directly affect animals in the vernal pool.

Does Biochar change Dissolved Oxygen? Biochar appears to be good at attaching heavy metals, but there are indications that it also reduces oxygen in the surrounding water.

Inclusion of amphibian species and fairy shrimp in the study is appropriate, however, the range of species should be broadened to better reflect the vernal pool community. The amphibian species should include both facultative and obligate species. **Caddisfly larvae** should be included as otherwise an important functional group in vernal pool ecology is not represented. Studies have shown a significant decrease in tissue lipid levels in oligochaetes subjected to activated carbon. Is it possible that in addition to binding PCBs, activated carbon is binding nutrients? These sublethal effects may be discernible through metabolic studies that could be added to bench studies.

A bench-scale study raising woodfrog/fairy shrimp (or a proxy) and other ecologically important species would be appropriate.

In the field

If powdered Activated Carbon is applied, it will be very important to apply it when it cannot clog the gills or otherwise impair vernal pool animals - perhaps when the pool is dry, although it could resuspend when the pool fills.

It appears that Activated Carbon may bind PCBs better when tilled into the sediment, however, the whole benefit of using carbon is to avoid this kind of disturbance.

Upland areas around the vernal pools

Another complication in assessing proposed treatments is that areas around the vernal pools—potentially 300 feet away or more—provide critical non-breeding habitat for many vernal pool-related organisms. Populations of obligate wood frogs and mole salamanders, as well as those of various facultative vernal pool amphibians, will likely benefit from treatments that reduce bioavailability of PCBs within vernal pools, yet those populations could be harmed by subsequent nearby floodplain remediation. This complication should not be a reason to curtail remediation activities, but it encourages thoughtful project design and phasing, to reduce the environmental PCB load while maintaining vernal pool ecosystem function. While it would substantially expand the

scope of this pilot study, an assessment of remediation's effects on adjacent non-breeding habitat of obligate vernal pool amphibians could be considered.

Performance criteria should definitely include the species included for vernal pool certification, but for long-term health of these pools, comprehensive data collection is necessary. A before and after analysis of the macroinvertebrate community, as well as water quality indicators such as temperature, pH, alkalinity, and dissolved oxygen, should be considered. All of these should be tested throughout the water column because, even in these small pools, stratification can take place.

Initial monitoring should be performed at least weekly, if not daily, as soon as you introduce Activated Carbon to a pool. The frequency can be reduced based on those early observations but should continue through the time that the juvenile amphibians leave the pools. Broadening the protocol to include additional macroinvertebrates may be useful to document the recovery of a pool's ecological community following remediation. The assortment of macroinvertebrates that can be found in any individual vernal pool varies considerably pool to pool, but caddisflies (Order Trichoptera), particularly "log cabin" caddisflies in the genus *Limnephilus* (and a few other genera) are present in most. Caddisfly occurrence/abundance could potentially be another indicator of remediation success in many pools.

Monitoring for success will require long-term monitoring. As the Massachusetts Natural Heritage and Endangered Species Program pointed out, the mole salamanders may not reach sexual maturity and begin breeding for seven years. Immediately following the remediation by excavation of the vernal pool by the General Electric Company (GE) in 2006, all obligate vernal pool species, including fairy shrimp, were again present. (https://semspub.epa.gov/work/01/517769.pdf) Has recent monitoring shown that spotted salamanders are still returning to this pool to lay eggs in similar numbers indicating that eggs laid since the remediation have developed, and the young from those eggs have matured to return to breed in this pool?

We would like to see excavation done using the same care to measure the microtopography of the pool before and replicate that microtopography after. {NOTE: the study cited above, involved excavation in June, which is not preferred timing.] Instead of adding only large woody debris to the pools, we encourage sparse planting of native shrub willow and/or dogwood in the pool to allow amphibians to attach their egg masses. We urge the use of smaller equipment than was used in the original remediation to minimize disruption in the area surrounding the vernal pool. Work should be done so as to keep native canopy cover unchanged.

Leaf litter is very important to vernal pools. The organic material that is used to replace the contaminated material should contain native, locally-sourced leaf litter, and should be tested for PCBs, PFAS, and heavy metals before being added.

Thank you for considering our comments.

Sincerely,

Bruce Winn, Associate Professor of Environmental and Life Sciences
Berkshire Community College

Jane Winn, Executive Director
Berkshire Environmental Action Team

Tom Lautzenheiser, Senior Conservation Ecologist, Central/West
Mass Audubon
[*Mass Audubon submitted comments separate from this working group*]

Tom Tyning, Professor of Environmental and Life Sciences
Berkshire Community College