



By Electronic and Regular Mail

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Subject: Comments on Operation, Maintenance and Monitoring for Habitat

The Federal Natural Resource Trustees for the Hudson River -- the National Oceanic and Atmospheric Administration (NOAA) and the U.S. Fish and Wildlife Service (USFWS) -- are submitting comments on the "Operation, Maintenance, and Monitoring Scope for Phase 2 of the Remedial Action" (OM&M Scope), Attachment E to the Statement of Work within Appendix B of the 2010 Remedial Action Consent Decree for the Hudson River PCBs Superfund Site. These comments address the Monitoring and Maintenance of Habitat Replacement /Reconstruction described in the OM&M Scope.

The Hudson River Natural Resource Trustees are committed to restoring the Hudson River such that fish and wildlife can once again thrive and all people can fully enjoy the Hudson River and all that it offers.

The Federal Trustees' comments on the OM&M Scope reflect our concerns about technical aspects of the OM&M Scope with regards to monitoring and maintenance of habitat replacement/reconstruction, and provide our recommendations to address those issues. Our aim in sharing this information is to provide EPA our best available science, analyses and recommendations to help inform their decision-making regarding habitat monitoring and maintenance, and other aspects of the remedial action that impact the Trustee's natural resource damage assessment. The data regarding monitoring and maintenance of habitat replacement/reconstruction activities that will be collected pursuant to OM&M Scope have a bearing on the Trustees' natural resource damage claim.

The Federal Trustees recommend that EPA implement adaptive management measures to improve the reconstruction of habitats adversely impacted by remedial activities, including dredging and capping. The OM&M Scope describes, along with other tasks, the post-construction monitoring and adaptive management of habitat replacement/reconstruction

measures upon their implementation. This year is the first year following cessation of dredging and capping although habitat reconstruction efforts are planned in 2016 for areas remediated in 2015.

Our comments are based on observations made during several site visits by NOAA to Phase 1 and Phase 2 habitat replacement/reconstruction areas during the growing season as well as on findings reported in the 2013, 2014 and 2015 Monitoring, Maintenance, and Adaptive Management Reports (MMAM) for the Site prepared by Anchor QEA for GE, and the January 2016 Hudson River PCBs Superfund Site, Riverine Fringing Wetland and Submerged Aquatic Vegetation Restoration Inspection Report prepared by CDM Smith for New York State Department of Environmental Conservation. While four habitat types were identified during remedial design -- aquatic vegetation beds (SAV), riverine fringing wetlands (RFW), unconsolidated river bottom (UCB) and shoreline (SHO) -- our comments focus on SAV and RFW habitats. Supplemental comments on the 2015 MMAM (dated Feb 2016) may be submitted under separate cover.

Yearly benchmarks were developed for the different habitat types and are applied within a given certification unit (CU). The benchmark for reconstructed SAV five years after remedy implementation in a CU is at least 50% of the average plant cover and less than or equal average percent of invasive species of reference SAV. The benchmark for reconstructed RFW five years after remedy implementation in a CU is at least 85% of average plant cover and less than or equal average percent of invasive species of reference wetlands.

The following issues have been identified as potentially contributing to non-attainment of benchmarks, raising concerns about future likely non-attainment of success criteria:

- Elevations too high or too low to support RFW
 - Construction inconsistent with design
 - Backfill tolerances too wide and thus not conducive to plant growth and survival
 - Wave action, high flows and manipulated water levels moving placed backfill and modifying bed profile
 - Plant species installed at elevations inconsistent with undisturbed wetlands
 - SAV growing in designated RFW habitat replacement/reconstruction areas
- Substrate does not always match contract specifications
 - Construction material inconsistent with design
 - Winnowing of backfill material
 - Deposition of upstream material into reconstructed habitat
- RFW observed with limited cover, biomass and diversity
 - Phase 1 areas only seeded, installed plants are larger and provide more cover and biomass, where survive
 - Non-optimum elevations and/or substrate
 - Herbivory
 - Planting density may not be sufficient to minimize erosion and herbivory
- Steep slopes observed in some RFW areas

- Construction on 3:1 slope not suitable for RFW and can contribute to erosion and sloughing of backfill material
- Herbivory
 - Deer and waterfowl signs observed in reconstructed RFW areas
 - Pulled plugs (human or animal?)
- Coir logs ineffective
- Coir blankets bunched up from wave action and/or high flows
 - Requires regular maintenance
 - Impediment to growth
- Wave-break berms ineffective at providing protection in some locations

The following recommendations are offered in the context of adaptive management opportunities that can be implemented in 2016 where results can be used to subsequently implement corrective actions with a goal to improve the trajectory toward meeting the benchmarks and success criteria thereby maximizing the quality, functionality, sustainability and resiliency of the impaired habitat.

We recommend that a study should be designed and conducted in 2016 to assess whether herbivory is having a significant impact on meeting RFW reconstruction benchmarks. At other wetland restoration sites herbivory has been a significant hindrance to plant re-establishment, survival and growth. The pending 2016 OM&M Plan for Caps and Habitat could include a task for the installation of cameras at a number of locations to assess whether browsing by herbivores contributes to the loss of planted and naturally recolonizing emergent plant species. In addition, exclusion fencing can be installed in portions of areas to be planted in 2016 to assess outcomes in fenced and unfenced area. Fenced and unfenced areas should be otherwise comparable, e.g., slope, elevation, grain-size, inundation period.

A second study should be conducted to assess whether increasing RFW plant installation density and plant size improves survivorship and coverage. Test at densities less than 2 feet on center, e.g., 0.5 foot and 1 foot on center, and compare to areas already planted at 2 feet on center. Also test whether survival and growth are better with plugs versus quart-size plants. Ensure that elevations and inundation periods of test plots are optimum to support plant survival and growth.

A third study could be designed to assess placement of sand bars or other measures to serve as wave-break berms and ice deflector to protect RFW areas where erosion has been observed.

In addition, water elevation gauges could be deployed to determine how and if hydrofacility manipulated water elevations are having effects on RFW re-establishment.

It appears that SAV may have been included in the cover estimate for RFW and inflated the recovery of RFW. SAV, with the exception of water lily (*Nymphaea odorata*), should not be counted toward attainment of the RFW percent cover benchmark. Similarly, RFW plant cover, other than water lily, within designed SAV area should not contribute to the total SAV cover.

At the same time, seedling cover of annual and perennial species is being counted toward overall RFW cover. Observationally, these plants generally present as low growth forms and the perennials are not likely to flower or produce reproductive structures. With the exception of wild rice, plants re-established through broadcasted seeds as part of remedial activities or from natural seed recolonization are unlikely to contribute substantially to the overall plant biomass relative to installed plants and will likely result in poor performance in achieving or exceeding success criteria. Consideration should be given to initiating monitoring of non-destructive measures, such as plant height, stem thickness and stem density to assess similarities and differences in these parameters between planted and seeded areas as well as between reconstructed and reference areas. Corrective plantings may also be warranted, assuming elevation, substrate, inundation period are suitable for optimal plant re-establishment.

A robust statistically based sampling plan should be the foundation for the monitoring of reconstructed habitat. The Federal Trustees suggest that EPA request the development of such a plan and would like to be afforded the opportunity to review and comment on the plan. Statistically based random unbiased monitoring of Phase 1 and Phase 2 RFW reference and reconstructed habitats should be designed to assess species composition (native and non-native), % cover of native and non-native species, plant height, stem thickness, stem density, slope, grain-size, sediment angularity, elevation, herbivory, inundation period, areal extent and evidence of erosion. Sample size should provide sufficient power to assess what factors are contributing to poor re-establishment and guide corrective actions where needed. The acreage of reconstructed habitat could be generated and stratified by percent cover. Maps and shape files should be included in the MMAM report. These should provide results for each metric that can be used to track differences between the pre-remediation, design, constructed and post-construction monitored habitat as well as assess recovery over time. The attribute table should also contain other information such as monitoring date, CU number, river section, river reach, Phase 1 or 2 designation, station identifier, year habitat initially constructed, years and type of supplemental action, etc. Results should be compared to results in reference RFW, design specifications, pre-remediated habitat and published species growth requirements.

Similarly we recommend that a more robust statistically based sampling plan should be designed and implemented for monitoring SAV passive and planted areas. Monitoring results one year after planting suggest that sampling was ineffective at detecting SAV in the quadrats sampled while underwater video documented the present of SAV. This finding supports changes to the monitoring plan that allows for an increase in the sample size to increase the reliability of the results.

Consideration should be given to replanting emergent vegetation in unvegetated RFW reconstructed areas where bare patches were observed interspersed with vegetated patches. To increase the likelihood of success, the elevation, inundation and substrate of the bare areas should be similar to that of the vegetated areas. Replanting is designed to minimize the loss of vegetated areas. Corrective action should be taken where RFW benchmarks of at least 90% of planted species and units were not met. Missing plants should be replaced in a manner to simultaneously meet the benchmark for plant species composition.

The 1st, 2nd, 3rd and 5th year benchmarks for SAV were not met in several CUs based on quadrat sampling. CU5 was one out of nine CUs that fully met the 5-year benchmark for SAVs. CU9 and CU11 were two of the five CUs that fully met the 3-year benchmark for SAVs.

Consideration should be given to planting SAV in natural recolonization areas where benchmarks have not been attained or are not likely to be met. Where planted SAV survival is poor, an assessment of contributing factors should be conducted to inform and facilitate adaptive management measures. Additional plantings (including expanding the number of species and density of plantings) should be considered in the CUs that did not meet the 3-year and 5-year benchmark to enhance plant survival and cover in order to reduce the time to meet benchmarks. An assessment of physical conditions (substrate, slope, elevation, inundation, shade cover) in CU5 and CU11 and reference areas should be conducted and compared to areas where 3- and 5-year benchmarks were not obtained. Higher attainment of the 1st and 2nd year benchmarks and poorer attainment of 3rd and 5th year benchmarks may be related to improved plant stock and planting technique, lag time in plant re-establishment, or other factors.

The habitat ledger identifies numerous types of SAV areas that have been delineated but are not part of the habitat reconstruction, e.g., less than 2 feet water depth, greater than 8 feet water depth, within the navigation channel, etc. On numerous occasions we've raised concern with this approach as it reduces the functionality, sustainability and resiliency of the Hudson River ecosystem and increases injury to natural resources. Now we are given to understand that while restoration is not required within these exclusion areas, natural recolonization that occurs within the excluded areas can be counted toward reconstructed habitat to substitute for poor survival and growth in the 2-8 foot depth zone designated for passive natural recovery and active planting. This result in a smaller amount of SAV habitat restored. We recommend that if SAV exclusion areas identified within the design are not planted or identified upfront for natural recolonization, that they not be counted toward the total habitat reconstructed. Otherwise the amount of habitat reconstructed within the design and construction areas could be even less than anticipated because some of the deficient acres are compensated for by growth in the exclusion areas.

We appreciate the opportunity to adaptively address concerns with the habitat reconstruction through offering suggestions to address issues regarding the OM&M program for habitat in 2016 and look forward to further coordination with EPA on our joint goal of successful recovery of Hudson River habitat. We look forward to receiving and commenting upon the 2016 OM&M Work Plan.

Sincerely,

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