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NSB NEW LONDON
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DEPARTMENT OF THE NAVY
NORTHERN DIVISION
NAVAL FACILITIES ENGINEERING COMMAND
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MAIL STOP, #82
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IN REPLY REFER TO

5090
Ser 2167/1823/ME

JUL 07 1994

Ms Christine Williams
Federal Facilities Section
U.S. Environmental Protection Agency
Region I
JFK Federal Building
Boston, Mass. 02203-2211

Re: ECOLOGICAL WORK AT AREA "A" DOWNSTREAM SITE

Dear Ms. Williams:

The purpose of this letter is to provide you with the Navy's plan of action for the ecological risk assessment at the Area "A" Downstream site at NSB New London.

Based on the 14 June 1994 site visit by personnel from the Navy and Halliburton NUS we feel that several items need further consideration and discussion in order to properly assess the contamination in this area. Enclosed is a summary of this site visit and some of our preliminary concerns.

It appears that there are major issues that need consensus prior to conducting this site characterization of the Area "A" Downstream to ensure a productive and useful investigation. Therefore, we would like to take this time to re-evaluate the assessment and prepare a site-specific ecological risk assessment work plan that can be reviewed and agreed upon by all parties. With an approved work plan in place, we will be prepared to conduct the necessary fieldwork in the early spring 1995.

I would also like to use this letter to document the change in our approach to performing an initial cleanup action at the DRMO site and Spent Acid Storage and Disposal site. As we have discussed the Navy is treating these cleanup actions as "time-critical" removal actions which will be documented with an Action Memorandum. These time-critical removal actions will be conducted in a manner that is consistent with the NCP.

If you have any questions, please call me at (610) 595-0567 ext. 162.

Sincerely,

Mark Evans
Remedial Project Manager
By direction of the Commanding Officer

Copy to:
Mark Leone, CTDEP
Andy Stackpole, NSB NLON
Kathy Trapp, HNUS
Matt Cochran, HNUS

Internal copy to
1823
1822/ML

Subject: Considerations in assessing contamination in the downstream area, New London, Ct. Sub Base

Personnel from the Navy and HNUS made a visual inspection of the proposed reference sites and the downstream area on 14 June 1994. The inspection began at the dam constructed as part of a dredging project. Construction of the dam resulted in the formation of a large, shallow wetland area whose surface area is almost entirely covered by emergent vegetation. Two apparently distinct water systems exist below the dam in the downstream area. Water draining the wetland area flows directly into one of the two water systems. Seepage from under the dam appears to be the likely contributor to water flowing into the second water system. Currently, other potential sources of water contributing to these two systems (e.g., groundwater) remain unidentified..

Although measurements were not taken during the visit, it is probable that water leaving the wetland area is low in oxygen. The odor of sulfur,indicative of odor deprived conditions, was distinct at the upper reaches of the stream and a distinct iron floc was present on the bottom of both streams and evident in the small ponds associated with the two water systems. Precipitation of iron may occur under anaerobic (no oxygen) conditions and may be occur as a the result of chemical or bacterial activities.

The downstream area is heavily canopied and dominated by various species of oaks. The only breaks in the canopy are associated with each of the small ponds. Because of the closed canopy, the streams receive little light, making them predominately allochthonous, detritus-based systems. Energy is derived primarily from organic input coming from the surrounding terrestrial system, not as a result of photosynthetic activities occurring within the streams. The substrates of both streams are dominated by partially decomposed organic material. A layer of organic material at least 8 inches deep was present in one stream; no hard substrate was encountered.

Given the limited physical diversity and apparently adverse chemical conditions, the fauna inhabiting these streams is expected to be dominated by detritivorus chironomids. Oligochaetes may be present. Frogs were observed in the streams and ponds in the downstream area; an unidentified turtle was observed in the upper pond.

The small ponds support limited emergent vegetation; no submerged vegetation was observed. Although samples were not collected from these ponds, it is probable the bottom substrates contain a large amount of organic matter, primarily in the form of leaf litter. Benthic fauna associated with the ponds is likely to be largely confined to species able to withstand long periods of anoxia (e.g., chironomids and oligochaetes).

The proposed reference ponds differed from the study locations in that they supported large populations of submergent vegetation and a more varied population of emergent macrophytes.

The presence of oxygen producing submerged vegetation suggests that ponds remain oxygenated throughout most of the day. These were larger bodies of water than most of the ponds in the downstream area and a greater portion of the surface received direct sunlight. While allochthonous inputs contribute to these systems, it is evident that autochthony (organic matter produced via photosynthesis occurring within the ponds) in both proposed reference sites is important. These observations indicate that the proposed reference ponds are inappropriate for comparison to the ponds in the downstream areas; their energy source and oxygen regime differ form the ponds in the downstream area. The stream originally selected as a potential reference stream was dry on 14 June; while the substrate was damp, water had ceased to flow in this system some time prior to the visit.

In view of the physical conditions and ambient water quality characteristics of the aquatic systems in the downstream area, it is recommended that the scope of work be reviewed and modified as necessary so that potential adverse impacts associated with chemicals (e.g., DDT) that may be present in the downstream area can be separated from the influence that the physical (low flow, closed canopy) and chemical (low oxygen production due to high organic content; formation of iron precipitant in the presence of sulfur) conditions may exerting on be biota.

The presence of frogs in both the ponds and streams in the downstream area suggest that conditions in these systems are adequate for supporting what appears to be a relatively large population of these amphibians. Data in the literature suggest that compared to other aquatic organisms, frogs are relatively resistant to DDT; acute effects solely dependent on exposure to heavily metals have not been demonstrated. Frogs are opportunistic breeders and will frequently lay eggs in any available body of water. They move to breeding ponds after adequate rainfall and leave immediately after breeding. Breeding choruses last only a few weeks and different species breed at different times (e.g., sequentially, not necessarily concurrently). Preforming a census of the population of frogs should begin at the beginning of the breeding season and continue to the end, and would require capturing, marking, and recapturing frogs every night. Because they are opportunistic, a frog will not necessarily return to the same pond year after year, making assessment of possible impacts due to chronic exposure to site contaminants difficult. With the exception of a few species, such as bullfrogs, most frogs spend a limited amount of time in the water; after breeding, they move into terrestrial habitats, sometimes at great distances from the breeding pond. If frogs did exhibit evidence of exposure to toxics, it would be difficult, if not impossible, to determine when the frog had come into contact with the contaminant. Given their opportunistic behavior, it is doubtful that performing a census of these organisms will indicate whether or not these organisms are being adversely impacted; it is possible that frogs inhabiting this area have moved in from surrounding areas, effectively masking any sublethal, chronic impact that may be occurring as a result of exposure to site contaminants. It is recommended that alternate methods (e.g., tests performed using *Xenopus*; surveys for aquatic salamanders) be considered to address potential adverse impacts to amphibia.

The physical characteristics and apparent water quality associated with the two water systems in the downstream area will make identifying reference streams and ponds difficult. Currently, only limited data are available to characterize the water quality of systems in the downstream area. Additional water quality data must be gathered on both water systems in order to identify

reference systems with comparable water quality. Because of the potentially unique nature on these systems, identifying appropriate reference sites may not be possible. Alternately, it may be possible to employ Rapid Bioassessment methodology to characterize the community in these systems and compare the data to data that may be available from Connecticut DEP. It is recommended that this option be explored before a plan to characterize the benthic community is finalized.

While performing sediment toxicity tests will aid in separating potential adverse impacts due to chemical contaminants from the influence of the restrictive physical and chemical environment, the nature of the sediments in these systems may make testing difficult. The high organic content of these sediments may result in a high oxygen demand under laboratory conditions, possibly requiring that test vessels be aerated for the duration of the tests. Under current test methodologies, aeration of test vessels is permissible when the dissolved oxygen concentration falls below 40% saturation. However, it is also acknowledged that aerating may alter the chemical nature of the sediments, resulting in test results not truly reflective of conditions in the downstream area. It is recommended that preliminary samples be collected from these areas and sent to the toxicity laboratory so that any alterations necessary in test methodology can be identified and incorporated into both the test methodology and interpretation of the data.

According to current methodologies, the water quality characteristics of the sites being examined in the study should be replicated, to the extent possible, by laboratories performing the sediment toxicity tests. In view of the observations made while investigating the downstream area, it is probable that time will be necessary to allow the laboratory to adjust the water quality characteristics so that water used in the sediment toxicity tests will match that of the downstream area.

Given the potential water quality characteristics of the downstream areas, the use of *Chironomus tentans*, rather than *Hyallela azteca* be considered as a substitute sediment toxicity test species. Based on the observations made on 14 June, it is probable that these communities will be dominated by chironomids. Ascertaining the impacts of sediment contaminants on these test organisms will provide a more meaningful indication of impacts that may be occurring on the benthic fauna in these systems.