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LETTER AND COMMENTS FROM UNIVERSITY OF MAINE REGARDING AN ESTUARINE ECOLOGICAL RISK ASSESSMENT CASE STUDY FOR NSY PORTSMOUTH ME
1/30/1993
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Ms. Nancy Beardsley
Department of Environmental Protection
State House Station 17
Augusta ME 04333

Dear Ms. Beardsley;

Having spent considerable time with the environmental study of the Kittery Shipyard area, I have come to understand to a fair degree a good part, but not all of it. Some of my problem stems from my inexperience in reviewing such 'data and progress report,' which does not resemble the kind of works I am familiar with: manuscripts or proposals. The other difficulty is a lack of guidance: It is a very broad opus, and I do not really understand what I am supposed to do with all, or parts of it. In most cases, only data are represented and I assume that I am not to attempt an interpretation.

Let me comment on the individual pieces of the report, and perhaps at the end attempt a summary.

Sample strategy: The rationale for the 21 sample stations in the Portsmouth Harbor area is well founded, however, being familiar with sediment dispersal, I wonder why all samples were located in nearshore areas. A station or two in a basin somewhere in the middle of Portsmouth Harbor and outside of the harbor, would have added much to complete the eventual picture of contaminant dispersal.

Type of analyses: The list of items to be considered is extraordinarily comprehensive, containing 'standard' items that will allow comparison with studies elsewhere. But it also includes items that seem to be specific to the local problem. The only suggestion I would have is the inclusion of meiofauna in the biological surveys: it is easily accessible (small samples suffice), it is very diverse, and it is very sensitive to environmental conditions. Clearly an undervalued portion of the biosphere, in this study as well as others I have seen.

3.1 Sediments: (data presentation, no interpretation) The raw data of size & sorting indicate that

not all stations were places of sediment accumulation, in the sense described in the study rationale: the fairly coarse sediments of stations 1, 14, 16, 18, 22, and 23 suggest that much bypassing occurs here, and that contaminants which are usually bound to fines should not show up as well in such places. Also: the fauna & flora on such coarser substrates should be different. Note: the data in table 1, column %CSM and %SSC are not accessible in this format.

3.2 Sediment toxicity: Of course, the results of this study contradict my statement above: it is just the coarse-grained stations that caused the greatest mortality. An explanation is needed!

3.3 Water column: Patchiness and time-of-sampling may be responsible for the variability observed. Overall, the numbers are not surprising, excepting NO_3 at York.

3.4 Water toxicity: Measurements of water toxicity are extraordinarily dependent upon careful sampling: tidal flushing changes the water column quickly, thus an explanation of sample strategy must accompany this report to make the results convincing. The current results are fine as far as they go: toxic water exists in Clark Cove. But the lack of such water elsewhere may be due to sampling.

3.5 Microbiology: (two figures are missing) I failed to comprehend this chapter, mostly due to obtuse writing.

3.6 Hydrodynamics: no expertise - no comment

3.7 Eelgrass: no expertise - no comment

3.8 Fucoid algae: As presented here, an irrelevant study. As the author notes, seaweed abundance is naturally patchy, determined by physical conditions.

3.9 Flounders & Lobsters: I am not surprised about the patchiness of abundances, fishermen and scuba divers know that. The puzzlement expressed by the author concerning the small size of flounders & lobsters (beware of his graph!) may be due to the season of sampling, both organisms are migrators. The large number of lobsters at trawl station 5 may be due to the eelgrass beds there - lobsters seek out kelp and other cover for shelter.

3.10 Mussels: A glaring lack of natural history here: mussels, particularly in the intertidal zone, are exposed to mechanical removal. During severe winters nearly all surfaces are cleaned off by ice, mild winters eliminate only the most exposed portions. Thus, a single or several year classes can occur at any one point. The multi-modality of sizes at several stations strongly argues that several year classes were encountered. The largest mussels were found nearest to the open Gulf of

Maine - that's how it should be: there's less ice there during the winter. This is a recruitment problem that has little to do with pollution and must not be confused with such.

3.11 Mussel deployment: All I can see here is that the biggest mussels had the highest mortality and that the smallest had the greatest potential to grow. So what? I seem to miss something here, but cannot find it in the writing nor the figures.

3.12 Infauna: These results clearly point to the difficulty of extracting a signal from an inherently noisy environment. Those numbers are all over the place (as are the organisms). Comparing the results of the toxicity test on *Ampelisca* (3.2) with the 'natural' occurrence of this species it is striking that the species does not occur where tests have indicated high levels of toxicity (= 1/2 proof), the puzzler then is, why does it not occur in those stations where no toxicity was indicated? (The discussion in this section was the most extensive and lucid of all. I really do not have more insight than presented here.)

3.13 Chemical contamination: (Jargon of the purest kind. My English teacher would have a field day with this writing! My eyes glazed over quickly.) Looking at the graphs, it becomes notable, that trace metals and organic contaminants in organic tissues are surprisingly evenly distributed (That impression is perhaps due to the logarithmic scale employed). The distribution of these chemical species in the sediment show the expected variability: proximity to sources, dispersal mechanisms, sediment characteristics, etc., all combine to produce these information-rich results. It awaits detailed analysis of such factors to explain the observed distributions. Some checking of metal concentration in sediments, eelgrass and deployed mussels show some very interesting positive and negative correlations. Such comparisons should be made systematically, much about the behavior of trace metals in natural systems could be read from it.

3.14 Chemical markers: No additional comments to those of the authors.

I hope that these comments will give you some guidance.

Sincerely,

Detmar Schnitker

Detmar Schnitker

Do you know what these stand for? They are explained once, then you are on your own. Gleaned primarily from reports originating in government labs. No wonder I often felt like an illiterate.

ANOVA
BAP
CLP
CRM
DBC
DBT
DDT
DYNHYD5
EMAP
EPA
ERLN
FDA
FLRA
GC
GC/MS
GFAA
HSWA
ICP
JEL SOP
LAB
LAB
MBT
MDL
MESO
MOA
MPN
NAI
NCBC
NCCOSC
NHFG
NICI
NOAA
NODC
NOSC
NPDES
OCN
PAH
PCB
PE
PHEN
PNSY
PYRE
QA/QC
RCRA
RFI
SAIC
SBOF
SDS
SOP
SRM
SWMU
TAM
TBT
UNH JEL
UNH OEP
USEPA
VOC
YYMMDD