The BTAG has reviewed the subject document and offers the following comments for your use, on behalf of NOAA, FWS, and EP members.

We have reviewed the FS and have arranged our comments below into two parts, the first pertaining to the north disposal area and the second part to the south disposal area. In general, the BTAG wishes to comment on the evaluation of alternatives. The remedial goals as to the ecological receptors, need to be more specific in detail for each of the alternative evaluations. There needs to be such an assessment in terms of objectives and goals in, with regard to ecological values, to make recommendations for specific alternatives. For example, in regard to ecological receptors, what will each alternative accomplish and how will the post-project monitoring evaluate these ecological goals?

With regard to the north disposal area, we have few concerns with the alternatives offered other than assurances that should be provided regarding the disturbances to the wetlands area. We agree that contamination of the wetlands is pretty high and that removal actions will be necessary; however, there was no indication that we could find regarding the length of time that the disturbance to the wetlands habitat would require. It would be valuable to estimate time and area to be disturbed i.e. how many acres are affected for what length of time will they be taken out of operation of wetlands? We suggest that post-remediation monitoring for the wetlands in the north disposal area be based on chemical analyses; we do not believe that toxicity studies would serve any useful purpose in the monitoring phase.

It is very clear to us that continuing sources of contamination to the river are represented by both the seeps along the north bank and by ground water discharges from both the north and the south disposal areas. It is mentioned in the document that some measures will be taken to control these sources, but we are not clear regarding their effectiveness. The extent of sediment removal required will be determined in the remedial design phase. It is not clear that the riverbank cover system will prevent contaminated groundwater from entering the river. The riverbank may simply divert the contaminated groundwater farther downstream. Remedial alternative NUS-4 (which provides groundwater collection and treatment) would provide a more protective remedy to NOAA resources.

The installation of a cap over areas 1, 2, and 3 (alternative CR-4A) would be a preferred alternative to dredging contaminated

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sediments from the river. Capping would result in less contamination to downstream areas as a result of remediation. Also, disposal of contaminated sediment in the north disposal site will likely result in further contamination through dewatering and leachate transfer from the north disposal site to the river and north disposal site wetlands. However, the areas to be remediated in the river (areas 1, 2, and/or 3) should be better defined to prevent toxicity of the river sediments.

Remediation in areas 1 and 2 will not reduce the toxicity that was seen at stations RS-11 and RS-12, but will take care of toxicity seen at stations RS-13, 14, and 01. Remediation the entire river (area 3) is probably not needed. Further sampling during remediation to identify areas with sediments that contain toxic levels of zinc or other site-related metals (normalized to grain size) could reduce the area to be remediated.

Significant toxicity was seen at station RS-07 downstream of the bridge. This station was not addressed in the Environmental Evaluation report. The FFS implies that areas downstream of the bridge are not affected by the site. The scope of remediation is limited to the area between the northern drainageway and the James Street Bridge. However, page 1-17 of the FFS states that metals concentrations increase at a point 0.4 miles downstream of the James Street Bridge and that this coincides with the historic outfall of an eastward flowing drainageway that originated in the South Disposal site. Remediation of the area around station RS-07 should be considered in the Feasibility Study.

However, we strongly urge you to include the strongest measures technically feasible to effectively reduce contamination to the river from these sources. If the seeps are considered to be a discharge (either point or non-point sources) and if the river is exceeding the criteria for those contaminants identified in the seeps then the CWA, as an ARAR, must be complied with. It is unclear to us that the cap proposed for this area or any other measure described in the document will bring the area into compliance. Section 2-4 (pages 4-33) are referenced with regard to the point that localized water quality violations need to be considered in light of remedial goals. Of course, any remedial measure should be accompanied by a fully described S&A plan designed to monitor for compliance.

The effort to minimize the disturbance to wetlands associated with the south disposal area is a good idea, but the information we have from past studies suggests that serious contamination exists in that area. Furthermore, it is still not clear how far the contamination extends into this area. Recognizing that contamination in this wetlands area is less than contamination in the wetlands on the north side, we still believe that either further study to fully characterize the extent of contamination or even remediation of the wetlands using existing information be carried out.

It appears to us that the preferred alternative for the south disposal site will not adequately prevent contamination from
entering the river or the south disposal site wetlands. Alternative SDS-4 will provide groundwater collection and treatment for groundwater that flows into the river, but only until the groundwater mound dissipates. The cap is expected to result in the reinstatement of regional groundwater flow, which is toward the south wetland. This would result in contaminated groundwater flowing into the restored wetland area.

The alternatives for the south wetlands are not adequately described. The preferred alternative will most likely not remove all sediments that have the potential to be toxic to biota. Remedial alternative SW-4 would provide the most protection to biota but the alternative should include further sediment analyses during the remedial design to identify levels of metals that would pose unacceptable risk. The pond in area E may not require remediation. Although the spatterdock was identified as a source of risk to muskrats, this should be evaluated against the current value of this pond as a habitat for muskrat and other wildlife. They should consider that sediments from the south disposal site be removed to a depth of approximately one foot based on lowest copper or zinc concentrations (normalized to grain size) that are associated with significant toxicity.

Given the broad extent and depth of sediment contamination, and the potential for future contamination of the south wetland from groundwater, it is probably technically infeasible to remove all contaminated sediment from the south disposal wetland. Without such a remedy, complete restoration to a tidal wetland that could provide uncontaminated habitat for NOAA resources would not be possible. The tide gate should therefore be maintained in order to prevent future use of this wetland by NOAA trust species.

In regard to our discussion on using toxicity results as a guide to remediate the wetlands, it would appear that such an approach could considerably minimize wetlands disturbances, however, our caution to this approach are as follows:

1. Do we have enough samples to be comfortable with an adequate knowledge of the over all extent of contamination?

2. A safety factor should be applied to assure ecological protection. The BTAG is interested in exploring this approach, and further assessing the information in hand now.

Specific comments follow:

The FFS acknowledges that the extent of environmental impact has not been adequately defined for purposes of remediation. Information on how the zone of impact will be defined or on how cleanup levels will be determined is not provided, except to state that the remedial design phase will likely include benthic surveys to more accurately define the areas of impact and extent of sediment removal.

The FFS should include the potential impacts that could result
Remedial goals need to be more specific to ecological resources. Specific accomplishments of each goal need to be listed and discussed.

Paragraph 1, page ES-4: Overall risk to terrestrial and wetland wildlife is considered low because the highest hazard index was calculated to be 1.7. However, the hazard quotient approach in environmental risk assessments does not include the same margins of protection afforded during human health risk assessments. A hazard quotient (or index) greater than 1 implies effects will occur. A hazard index of 1.7 is not small. If the risk assessment were conducted using more conservative numbers (for example, using the lowest observed effects levels instead of median values) hazard indices would have been much higher.

Page ES-9. The statement in the second paragraph about Metals should probably read "at the completion of the remedial action that might be above levels...".

The contention on pages 1-17 and 1-18 that past disposal practices (and not groundwater seepage) resulted in the river contamination is based on the fact that the surface sediments are less contaminated than the underlying layer, and that there is not a consistently high enrichment of metals between the north drainageway and the bridge. Also, groundwater enrichment is related to be different from metals enrichments seen in the river. These factors do not necessarily imply that groundwater contamination is not contributing to the contamination of the river sediments. As a relative source, historical disposal practices may have been greater than groundwater seepage if these enrichment factors account for grain size distributions.

Wetland replacement and enhancement for the north disposal site as described in the Feasibility Study will mitigate for the loss of wetland habitat in the drainage channel and along the "concrete jungle". This tidal wetland would provide habitat for NOAA resources. However, there is a good possibility that resources using this habitat will be exposed to contamination. The sediment in the wetland and at the mouth of the drainage channel should be monitored after remediation to demonstrate that resources are not at risk. A large potential source of contamination is contaminated groundwater from the north disposal site. Alternatives ND-3 and 4 do not provide a barrier for groundwater between the north disposal site and this newly created wetland.

Mitigation for the loss of wetland area during remediation was also not adequately described in the Feasibility Study. The removal of contaminated sediment should be followed by backfilling with clean sediment of an appropriate type to promote growth and replanting with shallow rooted vegetation such as Equisetum (scouring rush) or a sedge such as nutgrass. These types of grasses will stabilize the sediments and will not
provide a contaminant pathway to birds and other wildlife.

Proposed remedial alternatives include a limited and phased groundwater monitoring program to evaluate remediation effectiveness. Surface water monitoring was not included as part of the proposed program because it is being addressed in the NPDES permit investigation program. Pre and post-remediation sediment and groundwater monitoring should be included in the remedial program to ensure the selected remedial actions are providing sufficient protection to habitats and resources.

A post-remediation monitoring plan needs to be included in this document. This plan should address the landfill, north and south disposal sites, wetland sediments, Christina River sediments, leachate, and groundwater. The monitoring plan should include sampling locations and times, proper analytical tests (bioassays), and a contingency plan if toxicity is present.

The group, in summary, believes that serious and extensive contamination exists and that it poses a long term potential risk to the ecological resources of the area.

Thank you for extending to us the opportunity to review and comment. If you have any questions, please do not hesitate to call me.