U.S. ENVIRONMENTAL PROTECTION AGENCY, REGION 2

September 20, 2018

BY ELECTRONIC MAIL

Robert Law, Ph.D.
de maximis, inc.
186 Center Street, Suite 290
Clinton, New Jersey 08809

Re: Re: Lower Passaic River Study Area Draft Remedial Investigation Report – Administrative Settlement Agreement and Order on Consent for Remedial Investigation/Feasibility Study (Agreement) CERCLA Docket No. 02-2007-2009

Dear Dr. Law:

The U.S. Environmental Protection Agency (EPA) reviewed the Draft Remedial Investigation (RI) Report Section 5 and Appendix F dated December 2017 prepared by Anchor QEA for the Cooperating Parties Group (CPG). EPA submitted comments to the CPG on June 14, 2018. The revised text was received on July 19, 2018 and the response to EPA's comments were received from the CPG on July 27, 2018. Comments from partner agencies have be incorporated into the enclosed responses. In accordance with Section X, Paragraph 44(d) of the Agreement, EPA has enclosed an evaluation of CPG's revised RI Report with this letter.

Although the CPG indicated edits have been made to Section 9 and Appendix D (the BERA) as part of the Response to Comments, these revised documents have not yet been provided and thus have not been reviewed. Any unreviewed changes and further edits made by the CPG based on the evaluation of response will be reviewed after all revised sections and appendices have been combined. Additionally, EPA reserves the right to review the RI in its entirety at that time to ensure continuity between sections and consistency.

Please proceed with revisions to the draft RI Report consistent with the enclosed comment evaluations. If there are any questions or clarifications needed on EPA's enclosed comment evaluations, please contact me to discuss.

616165

Sincerely,

Diane Salkie, Remedial Project Manager
Lower Passaic River Study Area RI/FS
Enclosure

Cc: Zizila, F. (EPA)
Sivak, M. (EPA)
Hyatt, B. (CPG)
Otto, W. (CPG)

EPA COMMENTS –JUNE 14, 2018

Lower Passaic River Study Area Remedial Investigation/Feasibility Study, Remedial Investigation Report Section 5 and App F, dated Dec 2017

No	Section	General or Specific	Page No.	Comment	CPG Response (6/11/18)	EPA Evaluation of Response (9/20/18)
1	Section 5	General	N/A	The Baseline Ecological Risk Assessment Revision 2 Draft dated December 29, 2017 (BERA) is being reviewed by EPA and, therefore, is not finalized and approved. After the BERA is finalized and approved, all text in the RI that is not consistent with the approved BERA will need to be revised to be fully consistent. Similarly, EPA reserves the right to reexamine statements made in the text referring to and/or drawing conclusions from the BERA and other "in-prep" documents referenced in the RI.	Comment has been noted, but no response is needed.	The response is partially accepted. EPA expects that after the BERA is finalized and approved, all text in the RI will be revised to be fully consistent with the approved BERA.
2	Section 5	General	N/A	The text does not reflect the Dispute Resolution Decision issued by Walter Mugdan to the Cooperating Parties Group (CPG), by letter dated June 28, 2016, with the subject line: "Dispute Resolution - EPA Decision Pursuant to Administrative Settlement Agreement and Order on Consent for the RIFS, USEPA Region 2 CERCLA Docket No. 02-2007-2009," concerning the Region's direction to the CPG to use data from the top 15 cm of sediment to represent contaminant concentrations applicable to the biological exposure depth. The issue of benthic invertebrate exposure depth has been dealt with through the formal dispute resolution process, through a set of comments on the BERA (June 30, 2017 EPA comments on the October 7, 2016 Draft BERA), and through multiple conference calls and meetings. The report instead relied on use of a conceptual site model involving a 2-3 cm (and certainly less than 5 cm) biological exposure zone as an integral characteristic for assessments and conclusions presented in Section 5. This assumption and related topics render Section 5 unacceptable in current form. As explained in the Region 2 Staff Position Statement dated June 7, 2016, endorsed by the Dispute Resolution Decision, limiting the discussion of the exposure depth to the top few cm of sediment ignores the complex and regularly changing sediment surface and the dynamic benthic environment. Specific comments are provided below (Comments #3, #7, #15, and #33).	Text referencing a shallow sediment depth has been removed throughout Section 5. Surface sediment is defined as 0–15 cm, consistent with the Dispute Resolution Decision.	The response is accepted.
3	Section 5, second paragraph, third sentence	Specific	3	Second paragraph states, "Site-specific data demonstrate a shallow exposure depth for much of the benthic community within the sediment bed." No collection of benthic organisms was performed at depths other than the 15cm sediment grab. The Sediment Profile Imaging (SPI) data are the central basis for proposing a shallow exposure depth. The SPI data were collected at a single point in time and not for the purpose of determining the depth of exposure. All statements in the RI regarding a shallow exposure depth for benthic invertebrates should be deleted and revised to include the full 15 cm exposure. If a discussion of the SPI data remains in the text, the text should also explain uncertainty associated with relying on such a limited and variable dataset to draw conclusions about the depth of exposure. All text should be consistent with the June 2016 Dispute Resolution Decision. See Comment #2.	This sentence has been deleted. See response to Comment 2.	The response is partially accepted. The statements about shallow exposure depth have been addressed. However, there is still a discussion of SPI results as follows: "…described LPR sediments as highly dynamic in terms of erosion and deposition, and resulting in different stages of invertebrate community succession throughout the river." and "…species associated with early successional stages (e.g., small polychaete worms)" were observed in the brackish portion of the LPR. The next sentence states, "Evidence of larger, deeper-dwelling species (e.g., oligochaete worms and bivalves) associated with late successional stages was more frequently observed in the freshwater portion of the LPR, ***consistent with lower organic loading, lower sediment contamination, and greater habitat diversity in that portion of the LPR.***" The discussion first stated that the erosion and deposition are responsible for the observed different successional stages and sizes of worms, but then says the larger, older worms are present because of lower organic loading, lower contamination, and better habitat.

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						If the reason for finding larger, older worms is because of lower organic loading, lower contamination, and better habitat, the reason for finding the smaller worms would logically be higher organic loading and higher contamination. Revise the text as follows: "For example, during the sediment profile imaging (SPI) survey, species associated with early successional stages (e.g., small polychaete worms) were observed in the LPR at many locations, particularly in the "brackish" portion of the LPR ***where sediment contamination is higher***." ***(emphasis added to identify requested change)***
4	Section 5, second paragraph, fourth sentence	Specific	3	Text states, "The structure of the LPR fish community is typical of disturbed systems with a shorter, simpler food chain in which benthic omnivores exploit the settling solids coming from impervious surfaces and CSOs and urban runoff from the surrounding watershed." This statement, and the rest of the paragraph, imply that the structure of the fish community is solely impacted by depositing particles originating from sources outside of the river. This omits a primary source of contaminants in the food web, which are the in-river contaminated sediments. In addition, the current text could be interpreted to imply that fish community structure is not impacted by chemical contamination, which is not necessarily the case, and has not been demonstrated. The text needs to be revised to incorporate the in-river contaminated sediments as a primary source of contaminants in the food web.	Text referring to a shorter, simpler food chain has been removed throughout Section 5. The text has been revised to state that in addition to detritus, invertebrates, and settling solids, benthic omnivores feed on surface sediment to a small extent.	The response is partially accepted. The statement still emphasizes that settling solids from impervious surfaces, CSOs, and runoff, as opposed to the primary source of contaminants, the in-river contaminated sediment. Revise the statement to say, "*Benthic omnivore fish – the numerically dominant group among LPR fish – consume instream detritus, invertebrates, surface sediment, and the settling solids coming from impervious surfaces, CSOs, and urban runoff from the surrounding watershed.*"
5	5.2, first sentence	Specific	4	Text states, "Most of the biological communities observed in the LPR, which include benthic infaunal invertebrates, mollusks, and other macroinvertebrates, fish, birds, mammals, amphibians, and reptiles, are typical of urban estuarine environments (e.g., composed of species that tolerate degraded habitat conditions)." This statement broadly categorizes biota associated with this river as "species that tolerate degraded conditions". This statement is considered overly simplified and thus potentially misleading. If left uncorrected, this section characterizes most species associated with the lower Passaic River as indicators of degraded conditions. While true that some species found residing in and near the river may be more tolerant, to some extent, to degraded conditions of the river, *it's also true that many of the species (benthic macroinvertebrates, birds, fish, mammals) are found in more pristine environments and would likely thrive in a different setting.* Broadly categorizing river inhabitants as "typical of urban estuarine environments" unduly diminishes their importance in the river's ecosystem. Revise the statement to indicate that despite the degraded nature of the habitat, many of the species present within the LPR are also found in more pristine environments.	A footnote has been added to note that "tolerant" species can also thrive under less stressful conditions due to their adaptability to changing conditions.	The response is not accepted. The explanation should not be relegated to a footnote. The sentence should read: "*Most of the biological communities observed in the LPR, which include benthic infaunal invertebrates, mollusks, and other macroinvertebrates, fish, birds, mammals, amphibians, and reptiles, are typical of estuarine environments. While some species within the LPR are pollution tolerant species, the biological communities include species that are found in both degraded and pristine habitats.*" Not correcting the opening paragraph of Section 5.2 diminishes the importance of the river's existing biological communities and this is considered inappropriate for the purposes of this Superfund RI. If there are specific aquatic species which are only found in highly altered and/or polluted habitat, these could be identified, however, most species living in or using the river do not fall in this category and therefore, should not be characterized as such.

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6	5.2.1, first paragraph bullet, last sentence	Specific	5	Revise this statement to read: "Other habitat characteristics (such as grain size) and urban stressors (such as high organic inputs) can affect the type of benthic community that is possible in the LPRSA. ***In addition,*** sediment chemical concentrations have the potential to impact the benthic community." ***(emphasis added to identify requested change)***	Text has been revised as suggested.	The response is accepted.
7	5.2.1, first bullet and first and second paragraphs	Specific	6	This section states that benthic macroinvertebrates are only present to a sediment depth of less than 5cm, and that the burrowing activity is primarily to 2cm. The description appears to reflect the CPG's position that biological exposure occurs only in the top 2-3 cm of sediment, as presented in text on pages 5-6. This position contrasts with the assessments by the USEPA and Partner Agencies, that due to the conditions in this river (types of benthic invertebrates and their niche, and the cyclic erosion and deposition of the sediment bed causing periodic re-surfacing of more highly contaminated sediments), the zone of biological exposure for river assessments is 0- 15 cm, not 2-3 cm. The entire discussion must be deleted, and the text revised to reflect the June 2016 Dispute Resolution decision. See Comment #2. In addition, it should be noted in the text that, due to the river's hydrodynamic conditions, sediment contamination deeper than 15 cm must also be considered for remedial action planning purposes. Sediment deeper than 15 cm may be exposed from erosion as shown through the river's bathymetry surveys (See Comment #38).	Text referring to shallow exposure depths has been removed. See response to Comment 2. Comment noted regarding remedial action planning, no changes have been made to Section 5.2.1 related to the potential for exposures deeper than 15 cm (Comment 7). Remedial action planning is outside the scope of Section 5.	The response is accepted.
8	5.2.1, second paragraph	Specific	6	New text has been added to this section suggesting that the majority of benthic biomass is expected to be bivalves, based on Windward (in prep)-f. Based on footnote 3, Windward (in prep)-f is the updated bioaccumulation report which has not yet been submitted to EPA. However, EPA did receive an updated set of data regarding feeding guilds which shows a diversity of feeding strategies that varies considerably by river mile and by season. Additionally, the BERA states that worms are by far the most abundant member of the benthic community (63% to 88% of total abundance), with mollusks (bivalves and snails) being present in far smaller numbers (1-11% of total abundance). While there was no discussion of biomass in the BERA, polychaetes and oligochaetes dominate in all sections of the river. Therefore, CPG must delete the new text that reads "Bivalves are thought to dominate the benthic invertebrate community in terms of biomass (Windward [in prep]-f), consistent with other eastern U.S. estuaries (e.g., Dauer et al. 1987)."	The text has been deleted.	The response is accepted.
9	5.2.1, first full paragraph	Specific	7	Revise the paragraph as follows: "***Among other potential impacts to benthic community health (such as reduced survival, growth, and reproduction rates),*** chemical contamination in sediments ... "***(emphasis added to identify change)*** As currently written, readers may assume that "chemical avoidance" is the only or primary potential impact that sediment chemical contamination may impart on a benthic community, which is not accurate. Chemical toxicity may also impact benthic community health by adversely impacting survival, growth, and reproduction of the benthic community.	The text has been revised to state that, "In addition to potentially reducing survival, growth, or reproduction, chemical contamination in sediments…"	The response is accepted.
10	5.2.3, last paragraph, third sentence	Specific	8	Text states: "These data indicate that the LPR fish community is primarily a benthic-dominated food chain. The LPR fish community is typical of urban systems with a shorter, simpler food chain... with lower trophic levels (e.g., benthic omnivores) exploiting the settling solids coming from the impervious surfaces and CSOs of the surrounding watershed." Refer to Comment #4 above regarding the need to identify in-river sediments as a source of chemical uptake in the food chain. In the sentence about lower	The text regarding the shorter, simpler food chain has been deleted. Text regarding chemical pollution or tissue concentrations has not been added to Section	The response is partially accepted pending review of the revised Section 9 and Appendix D.

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				trophic levels exploiting the settling solids coming from sources outside the river, revise the text to include in-river contaminated sediments as the primary source of contaminants in the food web. In addition, while a heavily benthic-dominated food chain may exist, this condition does not diminish the occurrence and importance of contaminant uptake and bioaccumulation in upper trophic levels, as demonstrated by the tissue contaminant concentrations reported for white perch, American eel, and other higher trophic level species. Therefore, regardless of which trophic level in the food web is more "populated," contaminant uptake throughout the food web, as demonstrated by LPRSA data, is a significant finding and concern. Additional text should be added to this section to convey the fact that elevated levels of contaminants have also been detected in higher trophic level species. This point should not be negated by the food chain being benthic-dominated.	5.2.3, which describes only the fish community as surveyed. Information on fish tissue concentrations and potential chemical risk are provided in Section 9 and Appendix D, as appropriate.	
11	5.2.3, last paragraph, last sentence	Specific	8	The text states: "The LPR fish community is typical of urban systems with a shorter, simpler food chain…" As noted in EPA's comments on the last version of the RI, "*There is no evidence that fish diversity in the LPRSA is substantially unique compared to other similar systems in the Northeast. Any references in the document to a "unique" fish community that is "limited" or that has a "shortened" food chain in the LPRSA should be removed from the document.*" If there is evidence that the LPR fish community reflects a "shorter, simpler food chain", the supporting information should be provided here.	The text regarding a shorter, simpler food chain has been deleted.	The response is accepted.
12	5.2.3, first sentence	Specific	9	As noted in EPA's comments on the last version of the RI, *"clarify how impervious surfaces can be a source of settling solids."*	A footnote has been added that addresses this comment through a reference. Ian Droppo has published many articles that deal with the formation of complex flocculants/aggregates in urban systems influenced by non-point runoff and stormwater discharges (which are driven by impervious surfaces). The citation "(Droppo et al. 2002)" was added in the footnote indicated above. This citation had already been used in other parts of the RI, and the reference has been provided to USEPA (in the RI).	The response is partially accepted. See EPA's evaluation of response to Comment #4.
13	5.2.4, fifth and sixth sentences	Specific	9	The text states, "Gulls, geese, and ducks were the most commonly observed, with numbers and relative abundances of species varying by season (Figure 5-9). Shorebirds, wading birds (including herons/egrets), and other bird species (including piscivorous birds such as osprey, belted kingfisher, and double-crested cormorants) were less frequently observed. While true that certain bird species are more abundant than other species, this condition should not diminish the importance of the shorebirds, wading birds, and others which utilize the available habitat in this ecosystem (e.g., mudflats	Text has been added to indicate that the frequency of observance of birds is not necessarily an indication of exposure to chemical contamination. Risk to birds is	The response is partially accepted. Remove " ... were less frequently observed." and replace with "... are also present."

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				which often contain the highest levels of contamination in exposure zones) and which may accumulate contamination through multiple routes of exposure. This needs to be better conveyed and highlighted in the report. Revise the text to discuss that while shorebirds and wading birds may be less numerous, they are more at risk than the flocking birds.	discussed in Section 9.6.	
14	5.2.5	Specific	9 to 10	This section repeatedly states that "there was little evidence of mammals, likely due to limited suitable shoreline habitat". However, footnote 9 states that the "surveys did not target mammals, although mammalian species were sometimes noted incidentally". Because no surveys were performed to specifically assess the presence of "water-associated" mammals, it is not appropriate to conclude that there is limited evidence of them along the LPRSA. Revise the text to include the information from the footnote in the main text and either remove the conclusion about limited presence of mammals or discuss the potential bias associated with basing conclusions about mammals on observations from the 2010 habitat and avian surveys. As was done with Section 5.2.6 Amphibians and Reptiles, a list of "water-associated mammals" that could potentially be present should also be included.	Text has been added to highlight the uncertainty associated with mammal presence, given that no surveys have been conducted for mammals specifically. A list of species potentially present in the LPRSA (but not observed) is already included in the BERA (Appendix D, Section 2.5), as was done for reptiles/amphibians. Examples in the list include raccoons and harbor seals.	The response is accepted.
15	Section 5.3	Specific	10 to 11	Together with related discussions of "shallow exposure depth" (meaning a 2-3 cm depth per cited reference in the text) and "media of exposure" (primarily attributed to the "fluff' layer, thus omitting receptor exposure to contaminated bedded sediments), and use of Figure 5-7 as supporting information, this section and Section 5.2, require significant revision to fully reflect the potential for exposure to contaminated sediments within the LPR. See Comment #2. When "surface sediment" and "shallow LPR sediment bed" are discussed in the text, the text should be clarified to refer to the full 15 cm exposure depth.	The text has been revised. Detritivores and deposit feeders feed on particulates/fluff, detritus, and sediment. The urban condition is stated to potentially include toxicity from chemical contamination (which in turn affects ecology and food web dynamics). Bioaccumulation resulting from exposures to sediments is now clearly indicated in the text. Surface sediment is defined as 0–15 cm.	The response is accepted.
16	5.4.1 bullets	Specific	12	Missing from the summary bullets are the elevated 2,3,7,8-TCDD concentrations in white perch. Although not listed among the "large benthic fish", white perch whole body tissue 2,3,7,8-TCDD concentrations are among the highest reported in listed fish species and this species is abundant in the river (Fig. 5-12a and 5-12b). A similar observation is seen for other contaminants. White perch tissue concentrations are mentioned at the end of section, but should be presented in the upfront summary bullets as an important finding in this section.	The text has been revised to state that the highest 2,3,7,8-TCDD whole-body concentrations were found in carp, white catfish, and white perch.	The response is accepted.
17	5.4.1, first bullet, third sentence	Specific	12	First bullet states, "Excluding carp, whole-body tissue concentrations of 2,3,7,8-TCDD in large benthic fish (e.g., brown bullhead, channel catfish, white catfish, and white sucker) were generally higher than other fish species (Figure 5-	The text has been revised to state that the highest 2,3,7,8-TCDD	The response is accepted.

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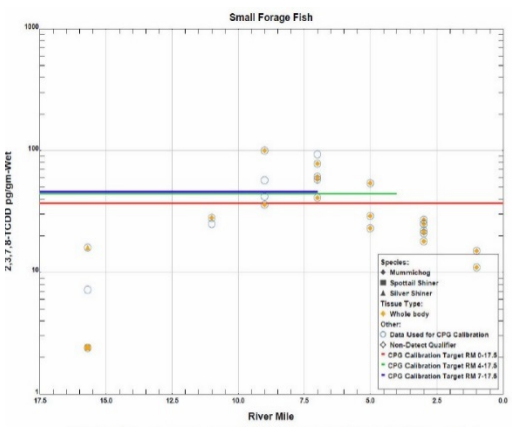
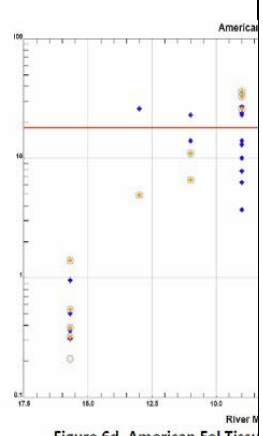
				12a)." The statement is not accurate . The mean concentrations for white perch and largemouth bass are higher than those in benthic fish. There is only a single sample for northern pike, but it is also higher than benthic fish. Additionally, the smallmouth bass concentrations are equivalent to the benthic fish. Revise the text to better reflect what is shown by the figure.	whole-body concentrations were found in carp, white catfish, and white perch. Comparisons of concentrations between benthic fish and other fish were removed.	
18	5.4.1, last sentence and Appendix F, Figure 1	Specific	12 to 13	Last paragraph, bottom of the page - New text states: "For many LPRSA fish species, 2,3,7,8- TCDD concentrations in whole body tissue samples were generally consistent across LPRSA Reaches 1 through 8 (e.g., see American eel and small forage fish in Appendix F, Figure 1)." EPA disagrees with this assessment. The scales in Appendix F, Figure 1 make it seem as though these concentrations are consistent as all concentrations are located in the bottom eighth of the graphs. Revise these graphs with a more appropriate y-axis and it will be apparent that forage fish concentrations and eel fillets show a relationship by river mile. The relationship is visible on Figures 6a and 6d from "Draft LPRSA RI_EPA 4.14.16 Comments Attachment 4 - Supplementary.pdf", previously submitted to CPG, and shown below:  Figure 6a. Small Forage Fish Tissue Concentration by RM  Figure 6d. American Eel Tissu	The figures in Appendix F have all been rescaled, as requested, to improve the discernibility of spatial trends (by reach) of tissue concentrations. Figure 1, which shows concentrations of 2,3,7,8-TCDD by species groups, indicates that there are spatial trends for some groups. In general, 2,3,7,8-TCDD increases in the mid-LPRSA and decreases toward the upper and lower reaches. This trend is reflected in the text already present in Section 5.4.1. Concentrations of 2,3,7,8-TCDD tend to be lower above Dundee Dam than in the LPRSA. The text in Section 5.4.1 has been revised to reflect these trends.	The response is accepted.
19	5.4.2, first full paragraph, second sentence and Appendix F, Figure 6	Specific	14	The text states: "For some LPRSA species, total PCB tissue concentrations were generally consistent in samples collected across Reaches 1 through 8 of the LPRSA (e.g., see small forage fish, smallmouth bass, and blue crab in Appendix F, Figure 6)." EPA disagrees with this assessment. The scales in Appendix F, Figure 6 make it impossible to discern spatial trends as for many graphs, all concentrations are located in the bottom eighth of the graphs. We know that forage fish show some notable differences by river mile (see below for Tetrachlorobiphenyl -- especially below RM 5 and greater than RM 10). Revise all of the graphs with a different y-axis that is appropriate to the species being considered, then revise the text.	The figures in Appendix F have been rescaled, and the associated text in Section 5.4.2 has been revised to reflect visible trends.	The response is accepted.

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				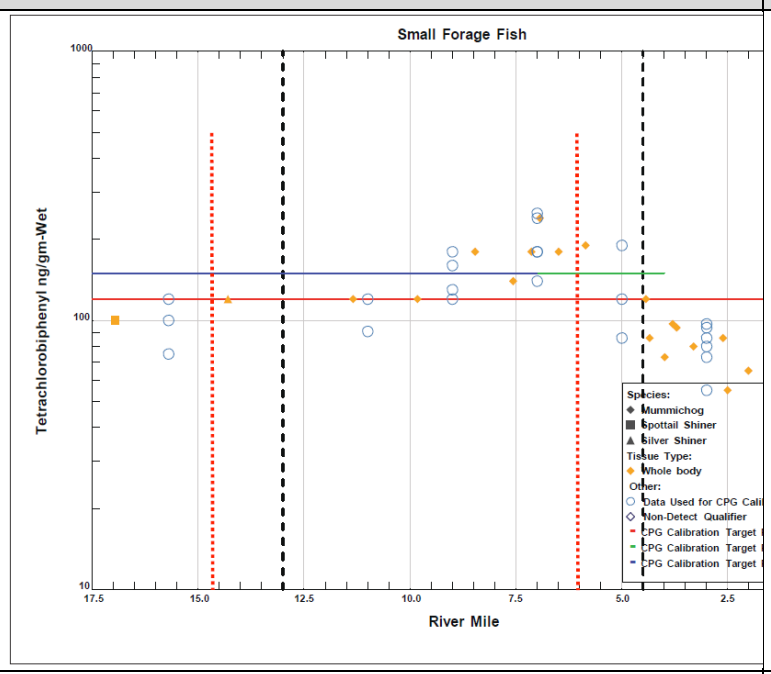		
20	5.4.2, first bullet	Specific	13	The text states that the Total PCB tissue concentrations ranged from 48-15,000 ug/kg, but Figure 5-14a (whole body) shows Total PCB tissue concentrations ranging from approximately 150- 7,000 ug/kg. Figure 5-14b (fillet) shows the 48-15,000 ug/kg range. Revise to make the text and figures clear and consistent.	The overall range in concentrations across tissue types was reported. The text has been revised for each chemical to specify the ranges of whole-body and fillet samples separately for all chemicals, to be consistent with figures that show whole-body and fillet data separately.	The response is accepted.
21	5.4.2, last sentence	Specific	13	The text states that UPR and LPR biota tissue PCB concentrations were similar for eel, channel catfish, smallmouth bass, and pike (per Appendix F). However, the UPR value for pike was non- detect, and was not similar to the LPR pike concentration. Revise the text.	Detected total PCB concentrations for pike were 330 (fillet) and 2,000 (whole-body) µg/kg ww for the LPR and 302 (fillet) and 1,880 (whole-body) µg.kg ww for UPR. Concentrations were detected and similar. No changes have been made to the text.	The response is accepted.
22	5.4.2, first full paragraph, last sentence	Specific	14	The text states that carp PCB concentrations were higher in Reaches 4 through 7, but they were actually higher in Reaches 3 through 7. Revise the text.	The text has been revised to Reaches 3 through 7.	The response is accepted.
23	5.4.3, first paragraph (after bullets), second sentence	Specific	15	Text states: "As discussed in Section 4.4, PAH concentrations in the sediment were elevated in the UPR compared to the LPR, indicating potential PAH sources from both above Dundee Dam and from lateral sources that feed into the LPR." (emphasis added via italics) While UPR and potential tributary sources of PAHs are of concern, the statement omits the importance of in-river, elevated PAH sediment contamination. Revise the text.	The text has been revised to remove “both” and include potential sources within the LPR.	The response is accepted.
24	5.4.3, last paragraph and Appendix F, Figures 11 and 16	Specific	15	The text and Figures 11 and 16 in Appendix F discusses HMW and LMW PAHs in tissues. Like all contaminants, due to differential bioaccumulation, it is not appropriate to use a single y-axis for each of these graphs and then try to interpret the spatial trends. Revise Figures 11 and 16 in Appendix F and revise the text conclusions regarding spatial trends.	The text in Section 5.4.3 has been revised to reflect updated Appendix F figure scales. The key change to the text	The response is accepted.

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					is related to the trend observed for HMW and LMW PAHs in blue crab tissues: These PAHs are higher in Reaches 1 through 4 than in Reaches 5 through 8. With regards to spatial trends in tissue concentrations, the difference between blue crab and fish species may be related to the relatively low (or negligible) metabolism of PAHs in invertebrate species such as blue crab. Fish are able to rapidly metabolize PAHs, which influence bioaccumulation and tissue concentrations.	
25	5.4.4, first paragraph (after bullets)	Specific	16	The text states that except for carp, fish tissue DDx is similar in UPR and LPR. Appendix F, Figure 21 shows that perch and catfish are also higher in LPR. Revise the text.	The text in Section 5.4.4 has been revised to reflect spatial trends in tissue concentrations that became apparent after rescaling Appendix F figures.	The response is accepted.
26	5.4.4, last paragraph and Appendix F, Figure 21	Specific	16	The text discusses DDx in tissues and Figure 21 in Appendix F. Like all contaminants, due to differential bioaccumulation, it is not appropriate to use a single y-axis for each of these graphs and then try to interpret the spatial trends. Revise Figure 21 in Appendix F and revise the text conclusions regarding spatial trends.	The text in Section 5.4.4 has been revised to reflect spatial trends in tissue concentrations that became apparent after rescaling Appendix F figures.	The response is accepted.
27	5.4.5, first bullet, second sentence	Specific	17	The text states: “Different than trends seen across major feeding guilds for the chemicals described above, mercury concentrations in whole-body and fillet tissues generally increased with increasing trophic level in fish”. EPA disagrees with this assessment. For 2,3,7,8 TCDD and Tetrachlorobiphenyl, white perch and bass have consistently much higher concentrations than those found in forage fish. Revise the text.	The text stating that trends were different has been deleted.	The response is accepted.
28	5.4.5, first bullet, last sentence	Specific	17	Text states pumpkinseed “had higher concentrations (and were larger in size)”. This statement is misleading, as Figure 5-17a shows that only one pumpkinseed was included in the data set. Revise the text to indicate single rather than multiple pumpkinseeds.	The text has been revised to indicate that there was only one pumpkinseed sample.	The response is accepted.

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29	5.4.5, first bullet, last sentence	Specific	17	As noted in EPA's comments on the last version of the RI, *"revise the text to indicate that the higher concentrations in white catfish are not unexpected since fish can make up a large portion of the diet for white catfish."*	Text has been added to the last sentence of the first bullet, stating that higher mercury concentrations in white catfish are not unexpected, because fish make up a large portion of that species' diet.	The response is accepted.
30	5.4.6	Specific	18	Revise the summary statement, because it doesn't currently reflect the key findings of the biota tissue contaminant concentrations as reported in Section 5's Tables and Figures. For each biota category and contaminant, this section should highlight the differences observed between UPR and LPR information. For example, based on review of Appendix F Tables 1a and 1b, it is noteworthy that although 2,3,7,8-TCDD is found in nearly every tissue type collected from either the UPR or LPR (for those species collected in both areas), the reported LPR maximum and median concentrations are typically 1 - 2 orders of magnitude greater than the UPR biota. This is a significant finding and should be highlighted for the purposes of the LPRSA RI. Not all contaminants share the same finding or degree of distinction between UPR and LPR, but nonetheless, require a full evaluation in a similar fashion.	Text has been added to note the general difference between LPRSA and UPR tissue concentrations for 2,3,7,8-TCDD, total PCBs, and total DDx. Text that mentions the magnitude of LPR 2,3,7,8-TCDD fish tissue concentrations compared with UPR tissue concentrations has been added to Section 5.5 (Key Findings). This magnitude of difference is largely limited to 2,3,7,8-TCDD.	The response is accepted.
31	5.5, first bullet	Specific	18	This bullet concludes that the urbanized setting of the LPR has resulted in an impacted ecological food web and, consequently impacted exposure of chemical contaminants in the food web. Regardless of the shape (number of individuals per trophic level) of the food web pyramid, the highly toxic, persistent and bioaccumulative COCs are found at enriched concentrations throughout the food web, presenting potentially unacceptable risks and hazards to all users of the river. As currently presented, the bullets inappropriately minimize the importance and consequences of contamination in the river's ecosystem. The first bullet should be revised to add the importance and consequences of sediment contamination on the river's ecosystem.	The first bullet has been revised to include a statement about chemical contamination.	The response is accepted.
32	5.5, second bullet	Specific	18	The text concludes that biota uptake of contaminants is limited by the "assumed shallow exposure depth" (meaning less than 5 cm), which limits any possible exposure to higher contaminant concentrations at depths greater than 5 cm. This bullet needs to be revised to recognize the June 2016 Dispute Resolution Decision (See Comment #2).	The text related to exposure depth has been deleted.	The response is accepted.
33	5.5, third bullet	Specific	18	The text concludes that a shallow oxygenated depth is observed throughout the LPRSA and this condition is solely attributable to CSO/SWOs and other urban-related runoff sources. Clarification is needed on whether the in-river organic chemical contaminant load is not also a potential contributor to a reduced oxygen environment, and if so, this should be stated. Chemical contamination and related chemical degradation reactions are typically associated with oxygen depletion in ecosystems. The text also states that the largest external source of OC to the LPR is flow over Dundee Dam. The bullet should be revised	Text has been added to indicate that chemical contamination can result in reduced oxygenation of sediments. Text has been added to note that OC flowing over Dundee Dam may decrease in the future.	The response is accepted.

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				to acknowledge the potential for future reductions in organic loads due to the role of the New Jersey 2008 UPR TMDL and planned reductions in CSO loads associated with New Jersey's CSO Long Term Control Plans (http://www.nj.gov/dep/dwq/cso.htm).		
34	5.5, fourth bullet	Specific	18	The text states that salinity is the primary influence on the benthic community and that other non-chemical stressors have adversely affected the benthic community. By omission, this bullet concludes that chemical conditions in the river have not adversely impacted benthic community function and structure. This bullet is misleading, and should be revised to state, "***While chemical contamination in sediment*** is a primary influence on the benthic community, ***salinity and*** other non-chemical stressors (e.g., TOC, sediment grain size, and other habitat characteristics) ***may also*** have adversely affected benthic community function and structure." ***(emphasis added to identify change)***	The text has been revised to include, "*…Chemical contamination also has the* potential *to impact benthic community function and structure; the effects of chemical contamination on benthic invertebrate communities is discussed in Section 9.4.*" Thus, the text now acknowledges sediment chemistry as a potential component affecting the benthic community, but there is no conclusion regarding effects or risk in Section 5.5. Section 5 is intended only to provide the environmental context for the system; Section 9.4 provides the actual quantification of impacts on benthic invertebrates (based on analyses in Appendix D) likely resulting from chemical exposures.	The response is accepted.
35	5.5, fifth bullet	Specific	18	The text concludes that the LPR fish community is primarily a benthic-dominated food chain and this structure, in CPG's view, is primarily attributed to a "disturbed urban estuarine river system". By omission, this presents the conclusion that chemical contamination is not a factor in the river's food chain structure. Revise the text to include the role of sediment contamination in the food chain.	The text has been revised to state that the food chain is benthic dominated, and that bioaccumulation dynamics may be affected by such a structure. It is no longer stated to be "consistent with a disturbed urban estuarine river system." No cause for the benthic-dominated food chain is stated in Section 5; the	The response is not accepted. The significance of this bullet is vague. Unless the RI data in section 5 demonstrated how bioaccumulation dynamics have been impacted by LPR fish community structure, this statement should be removed as a key finding of Section 5. Contaminants of concern are found in all trophic levels (bioaccumulation) at levels considered either potentially harmful to public health and/or ecological receptors. Add the following phrase to the beginning of the bullet for clarity: "Although chemical contamination has been detected in all LPR species".

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					food chain's structure merely reflects the relative abundances of different fish feeding groups, as surveyed.	
36	5.5, sixth bullet	Specific	18	The first statement focuses on identifying benthic fish as containing maximum levels of key contaminants of concern. However, this bullet should also note that many of the risk-driver contaminants are found *throughout the trophic levels of the aquatic food web* at concentrations that are typically 10 to 100 times higher than UPR biota, for those species for which comparisons can be made. This is an important observation of site RI data and therefore must be highlighted in this section.	A bullet has been added to Section 5.5 to highlight the large difference between 2,3,7,8-TCDD concentrations in some LPRSA and UPR fish tissue samples. This magnitude of difference is largely limited to 2,3,7,8-TCDD.	The response is accepted.
37	Figure 5-10	Specific	N/A	River erosive forces are known to scour to depths of greater than 6 inches, for example, to possible depths of 1 - 2 feet under certain circumstances, as shown through the river's bathymetry surveys. Erosion releases bedded sediment into the river's ecosystem for uptake in the food web. Revise the figure to incorporate the contribution of bedded sediment through erosive forces.	Figure 5-10 has been revised as requested.	The response is accepted
38	Appendix F Tables	General	N/A	In all of the tables (Tables 1a through 28b), "Calculated" whole body concentrations should be marked as "whole body (calculated)" (e.g., Table 1a Largemouth Bass, whole body). The calculation method used to convert fillet and carcass to whole body concentrations should be documented (or the location of this equation within the RI documents referenced.). EPA was unable to replicate the calculated whole-body concentrations presented in Appendix F Tables. For example, on Table 1a for northern pike, a concentration of 95 ng/kg is reported on the table, while EPA calculated a concentration of 116 ng/kg. EPA used Equation 5-3 presented in AECOM's Final Data Usability and Data Evaluation Plan for the LPRSA Risk Assessments, dated 15 May 2014, and the assumption for mass of 33% fraction for fillet and 67% fraction from carcass concentrations as presented on Table A-1 of the Windward Draft 2009 Fish and Blue Crab Tissue Chemistry Data for the LPRSA, dated 19 September 2011. Since the rounding of values at different points in data handling could account for part for these discrepancies, EPA requests that a detailed example for whole body calculation be presented. Note: samples LPR6-ELCT- IND001 (carcass concentration 170 ng/kg) and LPR6-ELFT-IND001 (fillet concentration of 7.6 ng/kg) were used to generate this example. The results for fillet and whole body concentrations presented in the tables were reproducible, when calculated whole body results were not included.	Data reduction rules, including the method used to convert fillet and carcass concentrations to whole-body concentrations, are presented in Section 4.3.4 of the BERA (Appendix D of the RI). However, the ratios of fillet to carcass are not provided. We propose to revise Appendix K2 of the BERA to include the spreadsheet attached (Calculated WB ratios [for BERA App K2] and example calc.xlxs), which includes the mass fraction of tissues (measured in the laboratory at the time of dissection) for use in calculations. Text has been added to Section 5.4 to reference the BERA as the source of data reduction rules, including the method used to convert fillet and	The response is partially accepted pending review of the BERA and revised BERA appendices.

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					carcass concentrations to whole-body concentrations. In addition, footnotes have been added to the tables to indicate which species included calculated whole-body concentrations, and a reference to Section 4.3.4 and Appendix K2 of the BERA (Appendix D of the RI) has been added. Significant figures have also been updated in Appendix F tables as appropriate. An example calculation has been included in the attached spreadsheet (Calculated WB ratios [for BERA App K2] and example calc.xlxs) to document how 2,3,7,8-TCDD concentrations were determined for Northern Pike.	
39	Appendix F Figures 1, 6, 11, 16, etc.	General	N/A	For all the figures showing spatial trends (e.g. Figures 1, 6, 11, 16, etc. with multiple frames of tissue concentrations versus river reach): As some organisms are more bioaccumulative than others, (and given that the y-axis of these graphs will be thrown off by individual outliers) each of the frames in these figures should have a re-scaled y axis. In RI Section 5, these graphs are interpreted to express the absence or presence of spatial trends. These conclusions would be quite different in many cases if the y-axis is rescaled for organisms with lower-concentrations.	Relevant figures in Appendix F have been rescaled to improve the discernibility of spatial trends in tissue chemical concentrations. Text throughout Section 5 has been updated to reflect figure changes.	The response is accepted.
New Comments on the Revised Text and Associated Figures/Tables (Dated July 19, 2018):						
41	5.1, first full paragraph	Specific	4	The characterization of mudflats river-wide still downplays their ecological significance. Text inappropriately regards these important areas as "...limited to small patches or isolated...". While wetland areas are limited or isolated due to development along the river's banks, the mudflats river-wide exist as expected, given the presence of the navigational channel and river hydrodynamics. What is meant by "small patches" in acreage? Mudflat acreage per reach should be added to this paragraph for improved perspective of this important habitat within the river.	N/A	N/A
42	5.2.1, second paragraph, second sentence	Specific	6	The sentence should be revised to state: "...legacy organic ***chemical*** contamination in bedded sediments..." ***(emphasis added to identify change)***	N/A	N/A
44	5.4, second bullet	Specific	11	Spell out “SFF”	N/A	N/A

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45	Figure 5-11 through 5-20	General	N/A	Figure 5-11 appears to be a repeat of Figure 5-10. Figure 5-11 should be deleted and all following figures renumbered to properly correlate with the figure references in the text.		

N/A – not applicable