

# **Trustee Comments on the Saginaw River and Floodplain and Saginaw Bay, Michigan Remedial Investigation Work Plan**

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## **1. Introduction**

The Trustees of the Tittabawassee River System Assessment Area (TRSAA) have prepared these general comments on the Saginaw River and Floodplain and Saginaw Bay, Michigan, Remedial Investigation Work Plan (RIWP) Volume 1 of 3 (ENVIRON, 2008b), including appendices, and the Current Conditions Report (CCR) for Saginaw Bay Basin, Saginaw River, Floodplain, and Bay (ENVIRON, 2008a) based on our initial review of these documents. Some specific comments on the RIWP and CCR content are also provided. Prior to October 31, 2008, we expect to provide more detailed, comprehensive comments after we thoroughly review the RIWP and CCR.

Currently, the RIWP and associated documents need improvement before they can assist in making informed decisions for future sampling, assessment, remediation and restoration decisions due to the limited and biased information presented therein. The RIWP presents a large number of summary conclusions, often without scientific support or attribution. Such conclusory statements are premature prior to conducting the remedial investigation (RI), and are inappropriate in the work plan other than as specific justification for the design of RI investigations. An overview of our comments that would improve the usefulness of the RIWP during subsequent drafts follows:

- } Provide a work plan that will sufficiently characterize the nature and extent of contamination in the Saginaw River, floodplain, and Saginaw Bay
- } Establish baseline conditions
- } Provide a more complete conceptual site model (CSM)
- } Expand investigation activities; specifically, field measurements
- } Provide a complete and unbiased summary of the Saginaw River and Bay ecology
- } Revise Screening Level Ecological Risk Assessment (SLERA) and Baseline Ecological Risk Assessment (BERA) work plan approaches
- } Provide a complete and unbiased summary of human services provided by natural resources
- } Provide a complete and unbiased CCR
- } Address specific comments in identified report sections.

## 2. Characterization of the Nature and Extent of Contamination

The characterization of the nature and extent of the contamination proposed by Dow in the RIWP appears to be insufficient to support remedial decisions. The objectives stated in the RIWP do not appear to be fully achievable based on the work plan as written. The sampling as described appears to be insufficient to fully determine pathways, estimate risk, produce a feasibility study, or begin to determine a final remedy. Further, it is insufficient for the delineation of the degree and spatial and temporal extent of exposure and injuries to natural resources. Whenever possible, data collection should be designed to maximize efficiency in generating information for both remedial decisions and natural resource damage assessment (NRDA).

These issues have obvious and important implications. For example, absent sufficient data, we will need to make conservative assumptions in our determination of the extent of injuries and damages in the TRSAA. Our general comments on the nature and the extent of the proposed contaminant characterization follow.

### 2.1 Characterization of the Nature of Contamination

- } The characterization of contamination appears to be limited to sediment sampling. The RIWP states that other abiotic media, including surface water, groundwater, and floodplain soils, will not be sampled. Based on a review of Appendices E and F (ecological and human health risk assessment work plans), it does not appear that further biotic sampling is planned either. Decisions on the media to be sampled should be based on the data that are needed for the development a CSM, the establishment of exposure pathways, the assessment of the fate and transport of contaminants, and validation of models and assumptions.
- } Proposed sampling for 2008 is focused exclusively on dioxins and furans and does not address other contaminants released from the Dow plant. Only those contaminants that are identified along the entire length of the Tittabawassee River will be considered for evaluation in the Saginaw River. This logic is flawed for several reasons:
  - ú Dow released hundreds of different contaminants into the TRSAA over several decades. The discussions of Potential Chemicals of Interest (PCOI) in the RIWP does not include Dow's Master List of PCOIs that contains 802 line items of chemicals used and produced by Dow Chemical Midland Plant, a plan to determine the nature of extent of the Dow PCOIs, or their pathways into the Saginaw River and Bay environments.

- ú The hydrodynamics of the Saginaw River are distinct from those encountered in the Tittabawassee River. Hence, different transport mechanisms may dominate contaminant distribution in the Saginaw River and Bay, potentially resulting in contaminants that are not found in the Tittabawassee River being found in the Saginaw River and Bay. According to Dow, the Saginaw River is a transient, mixed depositional environment near the confluence and becomes more depositional nearer the mouth, with slower velocities. Surface sediments have higher fractions of silt and clay than in the Tittabawassee River, and these fractions increase toward the Bay. As such, the contaminants that preferentially associate with finer silts and clays may not be subject to the bedload transport mechanisms that Dow has proposed control the fate and transport of dioxins and furans within the Tittabawassee River. Contaminants may be much more broadly distributed with the transport and deposition of finer materials in the Saginaw River and Bay, and contaminants released from the Midland plant in the past may have moved through the Tittabawassee River and then been deposited downstream. As such, the Saginaw River and Bay should be evaluated for the full extended target analyte list.
  
- ú Section 3.3.2.2 provides a very limited discussion of other “potential chemicals of interest”; however, this cursory discussion is largely confined to a broad-brush discounting of other chemicals of concern. The RIWP must be revised to fully consider all contaminants of potential concern discharged from Dow facilities.
  
- } Measurements to evaluate contaminant mass transport and deposition are not included in the RIWP. Furthermore, proposed modeling is focused only on sediment transport, and not on contaminant transport or contaminant mass. A tiered approach could be considered, including using the progressive collection of data, geostatistics, modeling, and model verification through additional sampling, and other investigation and assessment tools to identify and evaluate contaminant mass transport along the Saginaw River and into the Bay.
  
- } The work plan does not address the linkage between Saginaw River and the Bay.
  
- ú The RIWP is intended to address “concerns regarding the Saginaw River and Saginaw Bay” (RIWP, p. 1). However, the work plan focuses only on the Upper Saginaw River, defined as “extending approximately 6 miles from the confluence with the Tittabawassee and Shiawassee Rivers at approximately Green Point Island to the Sixth Street Turning Basin” (RIWP, p. 1). This narrow geographic focus is insufficient to address concerns regarding the Saginaw River and Bay. Moreover, the RIWP’s discussion of the Upper Saginaw River fails to address meaningfully pathway and ecological linkages between the Tittabawassee River,

the Saginaw River (upper and lower), and Saginaw Bay. The RIWP for the Upper Saginaw River is insufficient and incomplete without the proper watershed-scale consideration of contaminant transport processes (e.g., including movement, deposition, remobilization), the dynamics of biological uptake (including species, exposure mechanisms, pathways), and risks to human health and the environment.

## 2.2 Characterization of the Extent of Contamination

The current information on the extent of contamination as presented in the RIWP (specifically, Section 3.3) is inconsistent and varied over many years; therefore, it is insufficient in determining or establishing trends in contribution of hazardous substances from the Dow facility to contamination in the area.

- } No sampling is proposed for Saginaw Bay, and sampling in the Saginaw River is limited only to the upper part of the river (i.e., the first 5 miles of the 22-mile river). Extent of the contamination and the fate and transport of substances originating from Dow should be delineated for the whole Saginaw River and Bay. The RIWP only proposes characterization of the upper Saginaw River, and only in sediments.
  - ú The last paragraph of the RIWP Geomorphology Section 3.1.6 states that the Saginaw River is a net depositional environment. If this is correct, then the Saginaw River and Bay sampling should be as important as the Tittabawassee River sampling, yet less sampling is proposed. Secondly, the geomorphology of this area does not appear to be adequately understood to make such sweeping assumptions.
- } No basis or justification is provided for the proposed sediment sampling plan, including how sampling locations and the number of samples were determined.
  - ú The sampling plan does not sufficiently take into consideration the geomorphology and hydrodynamics (e.g., erosional and depositional environments) of the Saginaw River and Bay. These factors should be taken into consideration, because they play an important role in the fate and transport (and hence location) of contaminants.
  - ú It is not clear why the geomorphology-based sediment sampling approach taken in the Tittabawassee River is not being applied to the Saginaw River and Bay.
  - ú Geographical areas that are anticipated to have high concentrations of contaminants, such as repeatedly flooded residential, agricultural, and recreational areas, are not specifically targeted for sampling.

- ú No approach is included, such as a decision tree, for further delineation of contamination if sampling identifies elevated concentrations of contaminants.
- } Groundwater needs to be investigated:
  - ú The fact that the groundwater aquifers are so interconnected to the surface water implies that groundwater studies are necessary to determine the impact of PCOIs to groundwater. The RIWP needs to assess groundwater impacts; otherwise the Trustees will need to make very conservative assumptions of the loss of groundwater resources and respective uses.
- } Depth of sampling is set based on contaminant depth profiles observed in the Tittabawassee River, along with limited sampling in Saginaw River. As noted by Dow, the hydrodynamics and depositional environment changes from the Tittabawassee River to the Bay, and so profiles in the upper reaches should not form the basis for decisions on sampling depths farther downstream. Depth of sampling should allow for determination of temporal trends in contamination.
- } There is an over-reliance on modeling, without a clear description of how models might be used or questions the models are being used to answer (which should help to determine and evaluate the appropriateness of selected models), or plans for model validation/verification with sampling.
  - ú The RIWP refers to the development of hydrodynamic and sediment transport modeling. However, there is no description or discussion of the questions that will be addressed by such modeling, how the models will be used to answer key management questions, and how model development will proceed to ensure that key management questions are addressed.
- } Hydrodynamic monitoring and sediment transport measurements are exclusively focused on the upper Saginaw River. These measurements are needed along the entire Saginaw River and in the Bay to understand the physical processes governing the fate and transport of contaminants.
- } Age dating of sediment core samples is not included in the measurements and analyses proposed by Dow. Such analyses would provide valuable information both to the evaluation of the appropriateness of different remedial options, as well as the assessment of pathway and past conditions for NRDA purposes.

### **3. Establishment of Baseline Conditions**

- } Establishment of baseline conditions for remedial actions and assessments of timelines for recovery are not included in the RIWP. Projecting concentration trends (timelines) for dioxins/furans and other contaminants in sediments, soils, and biota, is important information to evaluate the recovery of natural resources for the Saginaw River and Bay.
- } If baseline conditions prior to the initiation of remedial actions are not established, it will be difficult to assess the effectiveness of the actions.

### **4. The Conceptual Site Model**

- } The purpose of a CSM is to describe and diagram the complete exposure pathways to be evaluated in the human health and ecological risk assessments, as well as the relationships between assessment endpoints and measures (see, for example, U.S. EPA, 1988, 1989). In contrast, the CSM described in the RIWP merely provides a cursory description (and general, unsupported, conclusions) of site geomorphology, hydrodynamics, sediment transport, and distributions of dioxins and dibenzofurans in sediment. The CSM makes no effort to describe complete exposure pathways to be evaluated. For example, there is no discussion of surface water pathways; sediment pore-water; the dynamic interactions of surface water, suspended sediments, bed sediments, and floodplain sediments; and the processes that may lead to exposure/risk/injury to biota and humans. Further, the CSM provides no means of relating hazardous substances sources, assessment endpoints, and potential measures of effect (including to human health and the environment).
- } The premise of the CSM and associated sampling is uncertain and therefore the proposed field measurements may be irrelevant. The statement regarding the PCOI's sorption is debatable as the model for contaminant transport is not well understood at this point. Some contaminants (including dioxins and furans) are obviously mobile but do not act in a predictable manner. Even if the concept of the lower Saginaw River and Saginaw Bay (SR/SB) acting a net depositional area can be broadly applied, then sampling to determine the deposition would be the logical next step, yet this is not being proposed.
- } Human and ecological receptors of concern are described in the BERA work plan (Appendix E) and the Human Health Risk Assessment work plan (Appendix F), and an ecological CSM schematic and a human health CSM schematic are provided in the respective work plans. While these fragments are provided, the CSM fails to tie it all together and provide a comprehensive overview of exposure pathways that link the sources to receptors.

## 5. Investigation Activities: Field Measurements

- } The floodplain sampling locations are extremely limited and do not provide sufficient characterization to determine the nature and extent of contamination, understand the fate and transport process, or assess risk to human or ecologic receptors.
  - ú In the benthic macroinvertebrate summaries in the CCR (Appendix A, p. 42), the authors state that the Saginaw River is more channelized than the Tittabawassee River, which might be a reason that toxicity was not found outside of the Tittabawassee River, but the lack of data from outside the channel may also be a reason that toxicity was not found.
- } Bedload samples should be chemically analyzed, if possible.

## 6. Summary the Saginaw River and Bay Ecology

- } The description of habitat conditions and biota include broad, sweeping statements that are often poorly referenced, or not referenced at all (this is true in general for the current conditions description in Chapter 3). Descriptions of the Bay fisheries in particular present a selective description of factors that may have adversely impacted fish populations, with little mention of the likely impacts of contaminants in the Bay.
- } Assertions that the Dow-funded Michigan State University study indicates no adverse impacts to ecological receptors are premature and cannot yet be independently evaluated, as the study is incomplete and all the results are not yet available. Only a small subset of the data and results have thus far been assembled in reports or published in peer-reviewed scientific publications. Not all potential receptors were studied and field studies always have limitations.
- } SLERA and BERA have not been approved by Michigan Department of Environmental Quality (MDEQ) or the U.S. Environmental Protection Agency (EPA), so any conclusions drawn from the studies are solely Dow's conclusions and have not been confirmed by MDEQ or EPA. The Trustees will review the ecological studies and ERAs as outlined in the NRDA Assessment Plan (AP).
- } Injury to benthic invertebrates has not been formally assessed and statements regarding the richness of the community or assertions that any population decline is due to invasive species need to be supported with data.
  - ú The determination that the source of sediment toxicity to invertebrates is not from Dow is not based on any applicable data presented in the report. Injury to benthic

invertebrates needs to be property assessed, especially near the Dow plant outfalls.

## 7. SLERA Comments

An over-riding and important issue in the SLERA work plan is that, as written, the SLERA will rely only on existing analytical chemistry data to identify those contaminants which cannot yet be removed from further risk assessment analysis. The issue is that this approach assumes that the list of contaminants analyzed in previous studies encompasses the complete list of contaminants released or discharged from Dow into the environment and that may still be present in the environment, including degradation products. The SLERA needs to include an evaluation of the historical information for the Dow plant site to determine whether the analyte lists for the available data are in fact comprehensive (including degradation products), or whether some compounds or classes of compounds have not yet been evaluated. Historical information is also necessary in evaluating the temporal extent of injuries for the NRDA.

} In SLERA work plan Section 2.1 (Development of Screening-Level Data Quality Objectives), it is not clear how the “preliminary questions to be answered in this phase of the SLERA” relate to the entire SLERA process.

ú None of the questions listed include the fundamental SLERA question of which contaminants can be safely removed from further risk assessment analyses. Furthermore, in the last question [“What wildlife receptor species are present in the area of interest that are expected to be significantly exposed to Chemicals of Potential Ecological Concern (COPECs) and should be evaluated in the BERA?”], the use of the term “significantly exposed” should be justified and explained in full. How will “significantly” be defined, and how will it be assessed? Is this inconsistent with the objective of the SLERA to include for further consideration only exposure that is “significant?”

} In SLERA work plan Section 3.1.3 (Receptor-Specific Dietary Exposure Modeling), the last sentence states “In this SLERA, dietary exposure modeling will be used only if it is necessary to screen COPECs for a specific receptor of concern.” This statement is vague and needs to be explained.

ú Exactly how will it be determined if it is “necessary?” This statement seems to suggest that dietary exposure will be included in the SLERA on only a limited basis, yet many of the types of chemicals released from the Dow facility are bioaccumulative. A better approach would be to include dietary exposure modeling for all contaminants that are bioaccumulative and do not exceed screening-level benchmarks in abiotic media (unless those benchmarks

conservatively include consideration of food chain exposure), or for which reliable screening-level benchmarks in all relevant abiotic media are unavailable.

- } This comment refers to Appendix E SLERA Work Plan Section 3.2.1 (Screening Level Ecological Benchmarks). To be consistent with the objective of the SLERA, the benchmarks used in the SLERA should represent no-effect levels rather than low-effect levels.
  - ú For example, the threshold effects concentrations (TEC) from MacDonald et al. (2000) represent concentrations above which “harmful effects on sediment-dwelling organisms are expected to occur frequently,” and thus are not appropriate for a SLERA. The TECs from MacDonald et al. (2000) are more appropriate for a BERA. This same approach should be used in the selection of all of the screening benchmarks.
- } This comment refers to SLERA Work Plan Section 4.2 (Uncertainty in the Screening Level ERA). This section is focused on the uncertainties in the hazard quotients that will be calculated in the SLERA. Instead, the uncertainty analysis for the SLERA should focus on the uncertainty around the primary objective of the SLERA, which is to identify those contaminants that can be safely removed from further risk assessment analyses.
  - ú The SLERA uncertainty analysis should focus on topics such as uncertainties in identifying the comprehensive list of contaminants released from the Dow facility, uncertainties in the characterization of the nature and extent of contamination, as well as uncertainties in the hazard quotients. Note, however, that only uncertainties which may produce hazard quotients that are too low are relevant for the objective of the SLERA.
- } Because NRDA considers injuries and damages over time, some hazardous substances which might properly be screened out in a SLERA because they are not currently posing a risk may still need to be considered for NRDA purposes.

## 8. BERA Comments

The conceptual approach outlined in the Saginaw River and Bay BERA work plan (Appendix E) is very similar to the BERA for the Tittabawassee River, and so many of the comments that we previously provided to Dow on the latter are also valid for the materials presented in Appendix E. As we previously stated, there are aspects of the BERA work plan that strongly suggest that the ecological risk assessment is being designed to arrive at a predetermined outcome that avoids cleanup even where risks might be clearly indicated. Only key points are reiterated here.

- } Dow indicates in the BERA work plan that population-level sustainability will be used as an assessment endpoint in ecological risk assessments.
  - ú It is rare to have contamination so severe and widespread that it threatens the sustainability of a population (DDT impacts to predatory birds in the 1960s and 1970s is one of the very few examples). Individuals within a population can be adversely impacted by contaminants without resulting in observed population-level effects or risks to population sustainability. Further, it can be difficult to identify causes of population-level effects, and to isolate contaminant effects from other stressors, such as predator/prey population changes, habitat changes, etc. As a result, population-level sustainability is not an acceptable assessment endpoint in ecological risk assessments.
  - ú The question is also inadequate from an NRDA perspective. Natural resource injuries and damages can exist in the absence of observed population-level effects. The risk assessment should be looking at endpoints at the individual level in order to more fully assess risk.
- } Dow indicates in the BERA work plan that a multiple lines of evidence approach is going to be taken to assess risk. The multiple lines include (1) dietary-based and (2) tissue-based exposure assessments using hazard quotient calculations where measured dietary/tissue COPEC concentrations are compared to literature toxicity threshold values, and (3) results of field studies assessing population sustainability.
  - ú The work plan seems to indicate that population-level data may be used to “trump” hazard quotients: “In those instances where HQ values are greater than one, additional lines of evidence will be examined to ascertain the magnitude and extent of any effect on a receptor.” In other words, according to the BERA, a hazard quotient greater than one may not result in an indication of risk, if other lines of evidence, such as population sustainability, do not show evidence of risk.
  - ú In our view, multiple lines of evidence should each be capable of concluding that there is unacceptable risk, even if other lines do not also indicate risk. This is antithetical to the approach described in the BERA where each line of evidence is capable of showing that there is no risk, regardless of risk indications in other lines of evidence.
- } The BERA focuses only on dioxins and furans. Other contaminants may need to be considered once the SLERA is completed. The proposed SLERA is focused only on additional contaminants identified in the Tittabawassee River. We question the validity of this approach, based on the contaminant transport mechanism issues discussed above. For the same reasons, we also question the assertion in the BERA that receptors are expected

to experience similar or lesser exposures on the Saginaw River and Bay than in the Tittabawassee River.

- } The BERA does not include all relevant receptors. Fish are sensitive to dioxins, furans, and other organic chemicals, and should be explicitly included in the work plan. Benthic invertebrates, amphibians, and reptiles are also not included in the BERA.

## **9. Summary of Impacts of Natural Resource Contamination on Human Services**

- } Chapter 3 of the RIWP does not mention the wild game advisories that have been issued. Reference to these advisories should be included in the RIWP.
- } The statement that only private landowners can hunt on their property without a license leaves the false impression that any adverse impacts to wild game will only impact the private landowners, and thus have minimal impacts. This is not true, and the statement should be clarified to indicate that private landowners can grant access to their lands to licensed hunters.
- } The description and summary of fish consumption advisories (FCAs) for the Saginaw River and Bay are grossly misrepresentative. In reading Chapter 3 of the RIWP, one might think that the only advisory issued for the River and Bay was in 2007. In fact, advisories have been issued for multiple contaminants over multiple years, and this should be reflected in the RIWP. A summary of FCAs is provided in the TRSAA Natural Resource Assessment Plan.
- } The beach/shore sampling appears limited and does not appear to be adequate to address direct contact concerns. What demonstration was done to show these locations are the areas of the greatest risk to the public?

## **10. Current Conditions Report Comments**

The CCR draws broad-reaching assumptions that are not adequately supported by the current data or references. There are current FCAs, there have been FCAs since detection levels of the contaminants of concern became precise and sensitive enough to allow for their measurement, and there will more than likely be FCAs in the foreseeable future. Stresses on the watershed such as non-point pollution and invasive species are threats to the environment in most watersheds, but the report is misleading in the extent to which it emphasizes these other stressors as more of a concern than dioxin and the many other contaminants released from Dow Chemical over the last 100 years. Dow is subject to corrective action under the Resource Conservation and

Recovery Act (RCRA) and is required to provide a complete characterization of off-site contamination and a remedy consistent with applicable state and federal law to address the releases.

We, the Trustees, do not agree with the conclusions drawn in this report regarding injuries to natural resources or loss of their associated service from the past, the present, or the future. We are currently conducting a NRDA following an assessment plan and attempting to maximize efficiencies by doing so in part cooperatively with Dow. Nonetheless, we will ultimately make our own determinations regarding injuries to natural resources and the services they provide. We want to be clear that we do not implicitly accept the broad assertions and claims in this document.

- } Current Conditions Sections 3.1.1-3.1.5 should be analyzed in the context of the intent of the work plan.
- } MDEQ's fish sampling program is sufficiently large such that the State has determined that there is a risk to the public consuming fish from the Tittabawassee River, Saginaw River, and Bay due to dioxins and furans. One aspect of the current condition of the fishery is that FCAs have been issued and fish are impacted.
- } The Bay City Middlegrounds site is under evaluation for groundwater surface interface compliance. The CCR states that the Middlegrounds is an ongoing source to the Saginaw River without referencing any supporting data. What data is this based upon?
- } Injuries to benthic invertebrates have not been formally assessed and statements regarding the richness of the community or assertions that any population decline is due to invasive species need to be supported with data.

## 11. Specific Comments Table

In addition to general comments above, we have some specific comments at this time that need to be addressed (Table 1). These comments were made during our review of the RIWP, CCR, and associated appendices. The report sections and resolution actions are provided to aid in addressing specific comments.

## References

ENVIRON. 2008a. Current Conditions Report for the Saginaw Bay Basin, Saginaw River, Floodplain, and Bay. Prepared by ENVIRON International Corporation for The Dow Chemical Company, Midland, MI. June 10.

ENVIRON. 2008b. Saginaw River and Floodplain and Saginaw Bay, Michigan Remedial Investigation Work Plan. Volume 1 of 3: Remedial Investigation Work. Prepared by ENVIRON International Corporation for The Dow Chemical Company, Midland, MI. June 10.

MacDonald, D.D., C.G. Ingersoll, and T.A. Berger. 2000. Development and evaluation of consensus-based sediment quality guidelines for freshwater ecosystems. *Archives of Environmental Contamination and Toxicology* 39:20-31.

U.S. EPA. 1988. Guidance for Conducting Remedial Investigations and Feasibility Studies under CERCLA, Interim Final. EPA 540/G-89/004. U.S. Environmental Protection Agency Office of Emergency and Remedial Response. Washington, D.C. October. Available: <http://www.epa.gov/superfund/policy/remedy/pdfs/540g-89004-s.pdf>. Accessed July 2008.

U.S. EPA. 1989. Getting Ready: Scoping the RI/FS. Directive 9355.3-01FS1 Solid Waste and Emergency Response OS-220. U.S. Environmental Protection Agency. November. Available: <http://www.epa.gov/superfund/policy/remedy/pdfs/93-55301fs1-s.pdf>. Accessed July 2008.

**Table 1. Specific comments that were made during review of the RIWP, CCR, and associated appendices**

<b>Report section</b>	<b>Comment</b>	<b>Resolution action</b>
RIWP Section 1.1 Objective / Purpose of Work	The Rule 528 citation listed in 1.1 is incomplete and inappropriately used.	Rule 528 states in part, “(1) The purpose of a remedial investigation is to assess site conditions in order to select an appropriate remedial action, if one is required, that adequately addresses those conditions. The remedial investigation identifies the source or sources of any contamination and defines the nature and extent of contamination originating from that source. Defining the nature and extent of contamination includes identifying contamination that may have migrated beyond the boundary of the source property in excess of applicable generic residential criteria. A RIWP or report prepared under this rule shall be consistent with this part and sufficient to support determinations under parts 6 and 7 of these rules, R 299.5525(6) or (7), if applicable, R 299.5532, R 299.5534, R 299.5536, section 20118(5) and (6) or the act, if applicable, and sections 20120a and 20120b of the act....”
RIWP Table 1.1 – Heading	Heading is inappropriate; as the work performed is required under the existing corrective action license.	Change table heading to reflect source of correct requirement.
RIWP Table 1.1 – (3)(m)	Provided text is inaccurate and unacceptable stated.	The ecological risk assessment will lend information to the NRDA; the NRDA Assessment Plan (dated April 2008) for the TRSAA.
RIWP Table 1.1 – (3)(o)	The applicable or relevant and appropriate requirements are also included in the RI as well as the remaining remedial process.	Review the documents and fix text.
RIWP Table 1.1 – (3)(q)	Groundwater impact will need to be determined for NRDA purposes.	Change table and included groundwater impacts in the overall site RI.
RIWP Section 2.2 Summary of Relevant Documents and Previous Investigations	Historical data, even though qualified due to changes in laboratory precision, need to be considered for past injuries in the NRDA.	Historical data should be presented to the Trustees in some form.

**Table 1. Specific comments that were made during review of the RIWP, CCR, and associated appendices (cont.)**

<b>Report section</b>	<b>Comment/commenter</b>	<b>Resolution action</b>
RIWP Section 2.3.2 2000-2001 Corrective Action	It should be clarified that the 2000-2001 remedial action was not performed by Dow.	Add text to section stating that Dow did not perform the 2000-2001 remedial action.
RIWP Section 3.1.9.3 Water Body Use	More discussion should occur regarding the use of the effects of shipping and navigation on sediment deposition.	Add discussion about shipping effects on sediment transport/deposition.
RIWP Section 3.1.9.3 Water Body Use	This section reads that declines or impacts to the fishery were only due to predation of invasive species and over fishing and not due to contamination of surface waters.	FCAs are a big component of the current conditions of the SR/SB and more details needs to be provided as to the consumption advisories with emphasis of the Potential Contaminants of Interest from Dow.
RIWP Section 3.1.9.3 Water Body Use	Wild game advisories need to be included in this section.	Add discussion on wild game advisories.
RIWP Section 3.2.1 Summary of Relevant Ecology Studies	The findings of the Galbraith studies should also be referenced.	Add Galbraith references. Please also note memorandum from Judith Gapp to Al Taylor dated 3/30/07 for further Trustee comments on the SLERA/BERA.
RIWP Section 3.2.4 Aquatic Life: Benthos	The discussion of the decrease of the benthic invertebrate community should also discuss the effects of contaminant deposition which is absent from the document.	Add a discussion of benthic invertebrate community responses to contaminant deposition.
RIWP Section 3.4 Human Use of Natural Resources	Soil/direct contact advisories need to be discussed in the Human Use of Natural Resources section.	Add a discussion on soil/direct contact advisories to this section (see the AP for a summary of these advisories).
RIWP Section 5.1.6 Sediment Profile Imaging	The benthic “study” in 5.1.6 is not adequate.	Defer to WHM for comments.

**Table 1. Specific comments that were made during review of the RIWP, CCR, and associated appendices (cont.)**

<b>Report section</b>	<b>Comment/commenter</b>	<b>Resolution action</b>
RIWP Section 5.7.2 Property Access Agreements	The statement in 5.7.2 “If access is denied, sampling will not proceed at that property” is not lawful or acceptable to preclude necessary sampling.	Under R299.5520(7) states, “Except as provided in subrule (8) of this rule, a person who has not secured access nor petitioned the circuit court for access within 1 year of the effective date of this amendatory rule, or 1 year of having reason to believe that access to another person’s property is necessary to comply with section 20114 of the act, whichever is later, is subject to penalties under the act.”
RIWP Section 8.5 Human Health Risk Assessment	Human health risk assessment overview in 8.5 does not address direct contact or wild game advisories.	Address wild game advisories in this section.
RIWP Section 11.1 Community Communications Plan Introduction	If future community reaction is negative, it is because the community is not accepting of the work plan or the fact that the releases occurred and have and are continuing to impact the environment and human uses of the environment.	This statement should be modified to reflect that the information should be transparent and the public will be kept fully informed of the results.
RIWP Section 11.3 Community Communications Plan	The fact sheet and other documents for the public should be submitted to MDEQ for comment and approval prior to release to the public.	Add text to the section.
RIWP Section 12 Project Organization	As provided under state law and under the license, MDEQ, EPA, and other regulation agencies have access to sample work areas.	MDEQ, EPA, and other regulatory agencies should not be included in any restrictions from work areas.
RIWP Table 3.2 Summary of Existing Avail. Sediment and Soils Data	The information provided in this table is not useful in developing a sense of the distribution of contamination in the SR/SB.	Frequency of detection does show that furan and dioxin toxic equivalents (TEQs) and other PCOIs are indeed in the area, and could be widespread depending of the sampling locations. The ensuing statistical analysis of the “data” is worthless in informing the reader of the current understanding of the nature and extent of the contamination.

**Table 1. Specific comments that were made during review of the RIWP, CCR, and associated appendices (cont.)**

<b>Report section</b>	<b>Comment/commenter</b>	<b>Resolution action</b>
RIWP Figure 3-10 Mean TEQ Levels (a-f) and 3-11 Mean TEQ Levels (a-f)	The diagrams are difficult to read and the shape and coloring of the data points are hard to distinguish. Putting all of the data points under 1,000 ppt is not helpful in determining lower levels of contamination, if present. The figures do show however, the large areas of the Saginaw River/Bay, and Saginaw River floodplains have not been sampled and how incomplete the dataset is to make assumptions for any proposed remedy at this juncture.	Rework TEQ bin sizes.
RIWP Appendix A CCR	Trustees do not agree with footnote number 12; as an agency must be conservative in protecting public health.	Remove footnote number 12 from the CCR.
RIWP Appendix C CSM Figures 8.2 and 8.5	These figures are misleading representations of temporal trends.	Trends should only be examined within species, sample type, and size of fish. Data sources need to be fully documented in figures.
RIWP Appendix E SLERA Work Section 3.1.3.2 (Estimation of Dietary Exposure for Avian and Mammalian Wildlife Receptors) Plan	More detail should be provided as to how single values for the exposure variables will be selected from the available sources (such as the Wildlife Exposure Factors Handbook).	To be consistent with the objective of the SLERA, reasonable values that produce the highest exposure levels should be used throughout.
RIWP Appendix E SLERA Work Plan Section 3.2 (Screening Level Ecological Effects Assessment)	This paragraph states that dietary and tissue-residue exposure will be evaluated only in the absence of benchmarks for abiotic media.	Dietary and tissue-residue exposure should also be evaluated for contaminants that are bioaccumulative and that do not exceed all abiotic media benchmarks (unless those benchmarks conservatively include consideration of food chain exposure).

**Table 1. Specific comments that were made during review of the RIWP, CCR, and associated appendices (cont.)**

Report section	Comment/commenter	Resolution action
RIWP Appendix E SLERA Work Plan Section 3.2.2 (Development of Toxicity Reference Values)	The third criterion for deeming a literature toxicity study as “high quality” is “Measurement of ecologically relevant endpoints.”	The term “ecologically relevant endpoints” should be defined and explained. For the objectives of a SLERA, conceivably any endpoint is relevant and should be included.
RIWP Appendix E SLERA Work Plan Section 4.1 (Screening Level Risk Calculation)	The last paragraph on this page states that there will be a pathway evaluation to “help focus resources to evaluate only those COPECs and exposure pathway combinations that may pose unacceptable ecological risk.” This statement is vague, and should be explained in much more detail.	As written, it does not seem consistent with the objective of the SLERA of identifying which contaminants can safely be removed from further risk assessment analyses.
RIWP Appendix E SLERA Work Plan Section 4.1 (Screening Level Risk Calculation)	Decision tree for screening COPECs may not be completely consistent with U.S. EPA guidance and may be inappropriate, in some cases, for determining whether a contaminant may need to be considered for NRDA.	Make changes to the Decision tree for screening COPECs.