

Questions to Guide Expert Panel Feedback

1. Have we sufficiently characterized the South River aquatic environment?

- Consensus on predominant pathways by which IHg & other constituents/conditions for methylation enter & move through aquatic system to sites of methylation
- Consensus on how Hg subsequently bioaccumulates within the food web to fish?

Assumptions:

We assume that the goal of “sufficiently characterized” is to guide remediation options.

We are not recommending options with goal of reducing Hg in fish to some specific tissue concentration. The recommendations are to continue to make progress and guide remediation.

Question 1: Answer

We suspect the answer is yes, but it hasn't been demonstrated yet in a weight of evidence fashion (e.g., are data collected from various studies consistent with each other?). The data need to be synthesized.

Question 1: Recommendations for IHg

Quantify conceptual model using existing data and starting with low-flow conditions.

- Map out potential sources (e.g., channel margin deposits, bedrock, cobble beds). (HIGH)
- Assign source terms and mass balance and compare with water quality data. (HIGH)

Reduce uncertainty through manipulation (e.g., laboratory experiments, field pilot studies) to help support modeling efforts.

- Determine connection of eroding banks and riverbed in parallel with modeling effort (HIGH).
- Determine mechanism of circulation within cobble/hyporeic zone (HIGH).

Question 1: Recommendations for MeHg

Conduct experimental work to see how methylmercury concentrations can be manipulated, focusing on major potential sources of MeHg to the food chain.

- Manipulate microbial communities or discourage specific microhabitats to understand MeHg in hyporeic zone.
(HIGH)
- Investigate potential chemical inhibitors.

Question 1: Recommendations for Bioaccumulation

Understand points of entry for MeHg into the invertebrate community to identify a potential component that can be beneficially manipulated. (HIGH)

Evaluate the effects of nutrient reduction on the macroinvertebrate community. (HIGH)

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2. Are we considering an appropriate blend of innovative watershed management & remedial technology options for managing risk & reducing MeHg levels in fish?

- Overlooking opportunities to modify critical methylmercury production compartments/processes or bioaccumulation pathways that will reduce MeHg concs. in South River biota?

Question 2: Answer and Recommendations

Good start, but need to form work groups to allow input from a larger group of individuals.

Question 2: Recommendations

Form three working groups to start formulating and designing pilot studies (coordinate efforts with manipulation experiments mentioned in Q1). (HIGH)

- Engineering options (sediment caps, bank stabilization, and point source control)
- Microbial manipulation (methylation)
- Trophic modification

Include microbiologists in work group(s). (HIGH)

Continue to partner with others working with nutrient, dissolved oxygen, and physical habitat issues in this reach of the South River (e.g., Dominion Power). (HIGH)

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3. Have we collected & analyzed sufficient data to reach a consensus understanding of fate & dynamics of Hg in the terrestrial environment adjacent to the South River?

Assumptions:

We assume that no “population level effect” exists in the terrestrial environment. Should this assumption be demonstrated to be invalid, we would need to revisit this question.

Question 3: Answer

We don't believe that data have been collected and analyzed in an appropriate manner to answer this question (e.g., a manner to be able to make inferences about population and a manner to determine whether the MeHg in spiders is coming from an aquatic or terrestrial source). It may not be necessary to address details of MeHg cycling in the terrestrial environment unless population level effects are demonstrated. Successful population level effect studies have been performed and are possible.

Question 3: Recommendations

Use population level effect as a benchmark in the terrestrial environment.

- Assess the data gathered to date to determine whether a population level effect exists. (HIGH)

Focus on reducing MeHg bioaccumulation to aquatic organisms first. (HIGH)

Observe the effect on the terrestrial food web. (LOW at this time)

Clarification Questions for Panel Feedback

- A. What are key uncertainties (ranked as H, M, & L), along with the rationale for ranking?**
- High: Further study and data collection required
 - Medium: Additional data would be helpful, but not required
 - Low: Further study is probably not warranted
- B. How can we close knowledge/understanding gaps?**
- C. What would laboratory/field studies look like?**
- D. If additional data collection & study are recommended, is it even feasible to collect these data?**