

The Role of Human Health Risk Assessment and Summary of Newtown Creek Risks and Hazards

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Human Health Risk Assessment

- EPA presentation to CAG May 15, 2013
 - Overview of EPA human health risk assessment process
 - Exposure pathways, cancer risk and non-cancer hazard calculations
- Risk assessment is a tool used by EPA to determine if remedial actions are necessary under EPA Superfund regulations – Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA)

Human Health Risk Assessment

- EPA presentation to CAG December 16, 2015
 - Draft human health risk assessment details, specifically focusing on fish tissue concentrations
 - Primary EPA concern with draft
 - Fish ingestion rates (dispute resolution)
 - Additional comments provided on the draft
- All comments were appropriately addressed in final version of HHRA – December 2017

What are Risks and Hazards?

$$\text{Risk} = \text{Exposure} \times \text{Toxicity}$$

Exposure: How, and how much, are people exposed to a chemical (site-specific assumptions and data)

Toxicity: The ability of the chemical to cause adverse health effects, cancer risk or non-cancer hazards (toxicity values based on animal/epidemiology studies)

Risk Assessment Process

- Data Evaluation: What chemicals are present and where are they?
- Exposure Assessment: Who is likely to be exposed under both current and future uses?
- Toxicity Assessment: What adverse effects are associated with these chemicals?
- Risk Characterization/Uncertainty: What are the risks/hazards at the site? What are the uncertainties and how do they influence the estimated risk?

Exposure Media

- Chemical concentrations were measured in surface water, sediment, fish tissue and ambient air and were included in the human health risk assessment

“This BHHRA focused on evaluating risks associated with exposure to standard CERCLA COPCs based on the screening described in Section 3.3. The conservative nature of the assumptions used in this BHHRA may lead to an overestimation of risks to human receptors evaluated in this BHHRA. An exception to this conclusion is the BHHRA’s focus solely on standard CERCLA COPCs—it does not include an evaluation of the potential risks associated with exposure to chemicals that are not listed under CERCLA, such as, among others, pharmaceuticals, **pathogens**, and personal care products. The lack of evaluation of non-CERCLA chemical exposures in the Study Area **may underestimate human health risks associated with exposures to surface water and surface sediments within the Study Area.**”

Exposure Pathways

- Current/Future Recreational Boaters
- Current/Future Swimmers/Bathers
- Current/Future Recreational Anglers and Crabbers
- Current/Future Shoreline Recreational Users
- Future Plank Road Area Recreational Users
- Current/Future Residents – Flooding Scenario
- Current/Future Landside Workers
- Current/Future Dockside Workers
- Future Construction Workers at Hunter's Point South
- Current/Future General Construction Workers
- Current/Future Occupational Workers – Flooding Scenario
- Current/Future Sailboat Users

Exposure parameters used with site data and toxicity values for each chemical to estimate potential cancer risks and non-cancer hazards

Exposure Parameters

Population	Exposure Duration	Exposure Frequency
Recreational Boaters	12-20 years	26 days/year
Swimmers/Bathers	12-20 years	17 days/year
Dockside Workers	25 years	3 days/year
General Construction Workers	1 year	86 days/year
Recreational Anglers/Crabbers	12-20 years	26 days/year
Sailboat User	5 years	52 days/year
Landside Workers	25 years	250 days/year
Occupational Workers - Flooding	25 years	3 days/year
Residential - Flooding	12-20 years	3 days/year
Hunter's Point Construction Worker	1 year	43 days/year
Plank Road Recreational Users	20 days	3 days/year
Shoreline Recreational Users	12-20 years	26 days/year

Human Health Risk Assessment Conclusions

- Contaminants contributing the most to human health risks include polychlorinated biphenyls (PCBs) and dioxins due to the consumption of fish and blue crabs from Newtown Creek. Regional Maximum Exposure (RME) fish and blue crab consumption result in a lifetime excess cancer risk that exceeds the U.S. EPA acceptable excess cancer risk range of 10^{-4} to 10^{-6} . Noncancer hazards above the U.S. EPA threshold (HI of 1) were also associated with consuming fish and blue crabs from Newtown Creek.
- For all other recreational receptors, the cancer risks are below or within U.S. EPA's acceptable risk range and noncancer hazards are below the hazard threshold. The general construction worker was the only occupational receptor with noncancer hazards above the hazard threshold. Cancer risks for the general construction worker were within U.S. EPA's acceptable risk range.
- Unacceptable cancer risks and non-cancer hazards provides regulatory ability to pursue a remedial action

Feasibility Study

- Remedial alternatives are evaluated to develop a list of remediation options to address the unacceptable risks and hazards
- Chemicals responsible for risks and hazards are addressed by remediation options
- Preliminary remediation goals are developed
 - Include **risk-based values**, background values and applicable or relevant and appropriate requirements (ARAR) and/or to be considered values (TBC)

Proposed Plan

- Summary document that addresses:
 - Site history
 - Results of remedial investigation
 - Summary of **human health** and ecological risk assessments
 - Comparison of remedial alternatives, identification of remediation goals and selection of proposed remedy
- Presented at a public meeting to obtain input from community

Record of Decision

- Legal document establishes the remedial decision for the site
- More detailed summaries on site history, remedial investigation, **human health and ecological risk assessments**, remediation goals and selected remedy
- Future steps are remedial design, remedial action and five-year reviews

Questions from CAG

- Would EPA accept or consider additional information related to the Human Health assessment?
- EPA is always open to receiving additional information regarding sites. EPA considers that the human health risk assessment is final, and it was completed in a comprehensive manner to address CERCLA human health risks. If additional information is provided, EPA will review the information and determine if it is relevant to the project. Given the completeness of the risk assessments, it is unlikely that the documents would be reopened, but if relevant information is received, it could modify or be incorporated into future documents and/or remedial alternatives.

Questions from CAG

- What about fish and crab that migrate? If I caught fish from the creek in an area that that's not contaminated wouldn't my health still be at risk? Has a tag and release study ever been conducted to assess this risk?
- The fish and crabs that were captured and used in the risk assessment include migratory species, which may have contamination from the site and from other areas. The goal of the risk assessment was to evaluate exposure from consumption of fish and crabs from Newtown Creek. This information is then used to develop remedial alternatives to reduce future risk from fish and crab contamination. NYSDEC and NYSDOH evaluate and implement fish advisories for recreational anglers and their advisories should be followed. Although EPA did not complete any tag and release studies, other researchers have looked at regional migration patterns in species.

Questions from CAG

- I think that the general public could easily be misled by that human health statement. I would not like to see folks in the water using the reasoning that it is OK because they are not eating any fish/crabs.
- EPA understands the confusion that could be related to isolated statements or conclusions from technical documents. EPA works with co-regulators to develop fact sheets to help eliminate confusion or misleading information.
- From EPA fact sheet: “ Based upon this assessment, the State of New York concluded that full body immersion in the Creek (e.g., swimming, scuba diving) could harm people’s health due to biological contaminants and physical hazards. The assessment also concluded that activities such as kayaking and catch and release fishing are not expected to impact people’s health so long as precautions are taken, such as properly washing hands and avoiding the ingestion of surface water.

Questions from CAG

- I am also perplexed by this statement or assumption. How is swimming considered a safe or not a Human Health related risk in the context of Superfund? Or taking drinking water from the creek.
- Similar to the previous answer, co-regulation of resources can be complicated and confusing. EPA's risk evaluation of surface water was focused on chemical contamination, with the results indicating that chemical contamination within the surface water is within or below EPA acceptable risk ranges for the exposures that were evaluated (i.e., swimming). NYSDEC and NYSDOH regulations address the biological contamination in Newtown Creek, which does have surface water hazards from pathogens.