

# Newtown Creek Community Advisory Group (CAG)

## Technical CAG Meeting Summary

March 20, 2019 Meeting  
Kingsland Wildflowers at Broadway Stages  
Brooklyn, NY

### Upcoming Meetings and Events

Event	Date	Venue
Newtown Creek CAG meeting	May 15, 2019, 6:30-8:30 PM	TBD
Newtown Creek TCAG (Technical CAG) meeting	June, date TBD, 6:30-8:30 PM	TBD
Newtown Creek CAG meeting	September 18, 2019, 6:30-8:30 PM	TBD
Newtown Creek TCAG meeting	October 16, 2019, 6:30-8:30 PM	TBD

The CAG will not meet in July or August.

### Site Updates

The second draft of the site remedial investigation (RI) is expected in April.

### Presentation and Discussions: Modeling Overview<sup>1</sup>

EPA presented an overview of the modeling process for the Newtown Creek Superfund Site.

#### The use of models in decision-making

Models are useful in that they are a tool to predict into the future. They explain a problem in scientific terms, project potential future scenarios, and help pick the best alternative to address the problem. Data is the foundation of any model; models use data to support a conceptual model, and then to create numerical or computational representation.

Models create a useful simplification of reality; however, models have limitations and constraints. EPA guidance takes those limitations into account and considers the assumptions and the uncertainties in the model in its use in decision-making process. Models may be used to make relative comparisons, for example. Model results are used as one of several lines of evidence to inform site decision-making.

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<sup>1</sup> The following is a summary of the presentation. Refer to the presentation slides found at <https://newtowncreekcag.files.wordpress.com/2019/04/technical-cag-modeling-presentation-03202019.pdf> for additional detail.

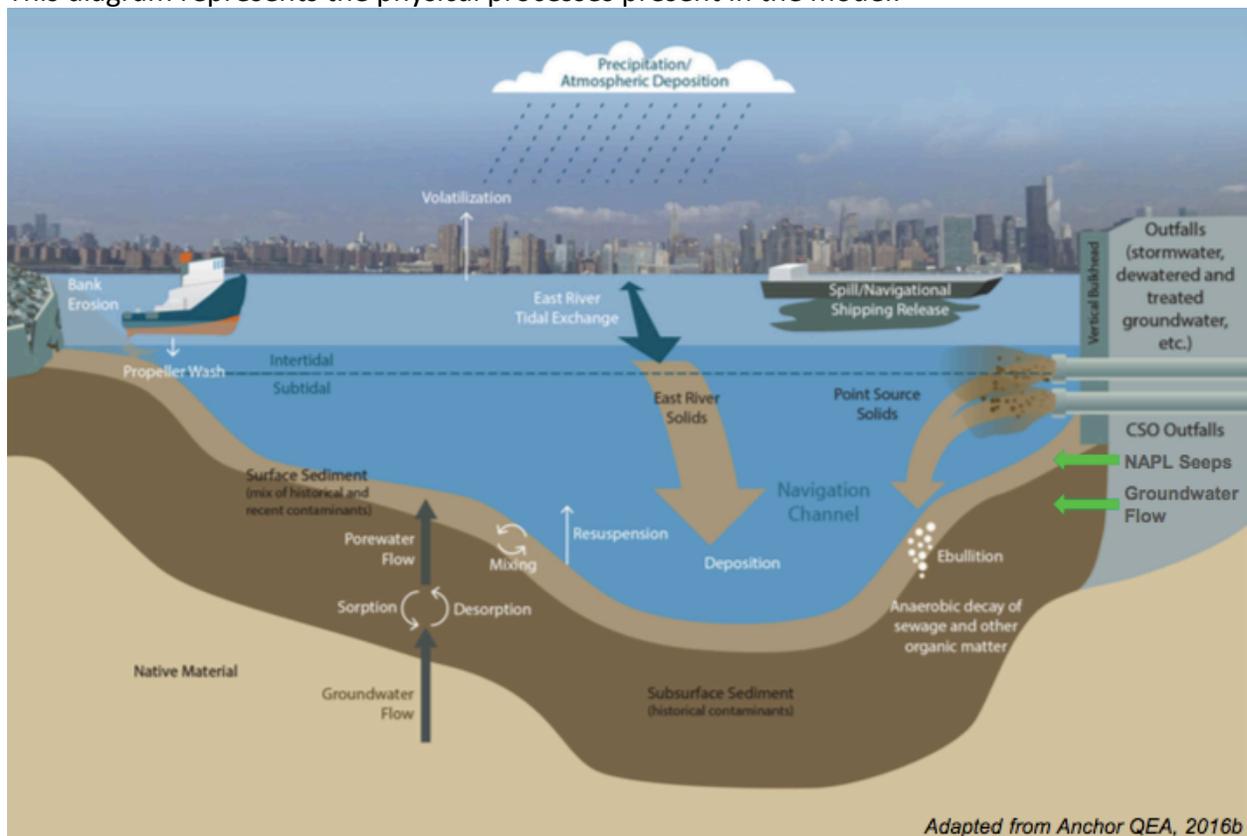
The scope and context of model use for the site

- For the remedial investigation (RI): Models are used in issues related to site characterization, including identifying data gaps, assessing contaminant fate and transport, and developing a conceptual site model.
- For the feasibility study (FS): Models are used to develop site management options as a predictive tool to compare remedial alternatives.
- Finally, models are used to support engineering of remedy design.

The conceptual site model

The conceptual model expresses in a schematic way the physical and food chain processes that move sediment and contaminants through the system. The objective of the model is to reproduce all of these processes.

This diagram represents the physical processes present in the model:



Contaminant fate and transport in the Creek are modeled by a suite of sub-models:

- The **watershed or point source model** simulates rainfall runoff, transport through the collection system, and release to Newtown Creek via CSOs and stormdrains. It then feeds information to the hydrodynamic, sediment transport, and contaminant fate and transport models.
- The **groundwater model** simulates rainfall infiltration, groundwater recharge, subsurface groundwater flow, release to Newtown Creek (exfiltration), loss to sewer

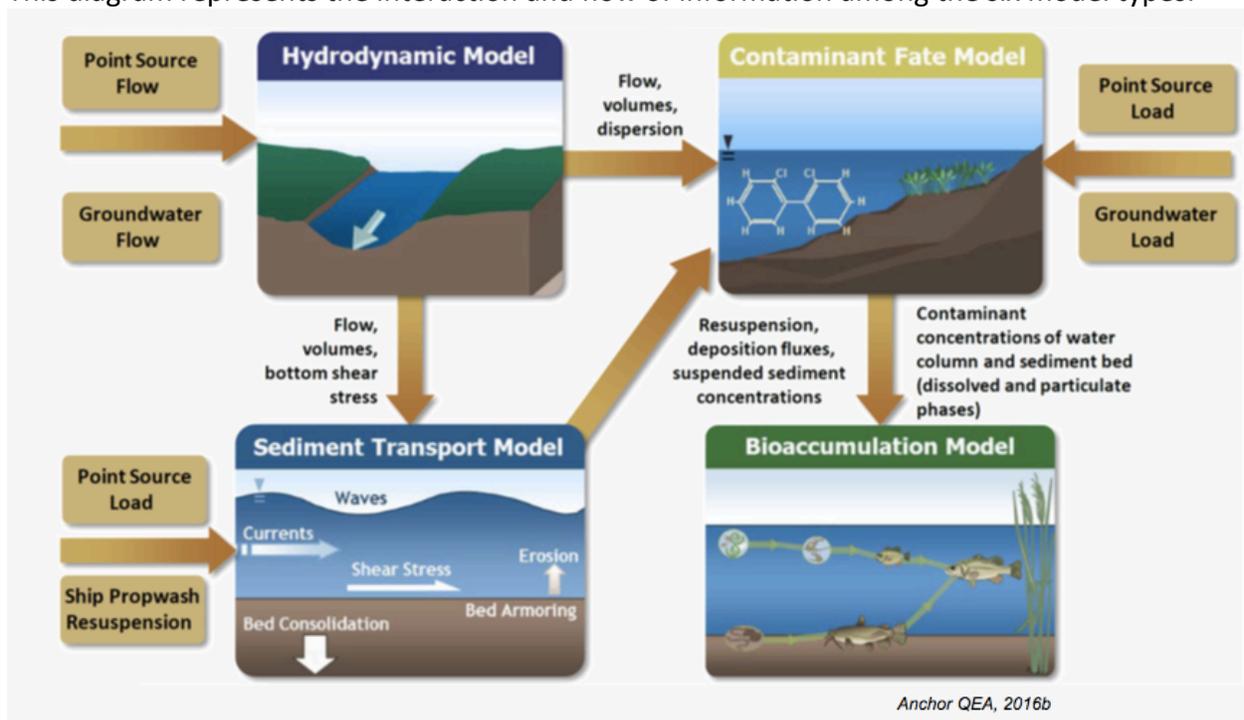
and subway system, and withdrawal. It then feeds information to the hydrodynamic and contaminant fate and transport models.

- The **hydrodynamic model** uses model information on currents, dispersion, water depths, salinity and temperature to simulate
  - freshwater inflows from CSOs, stormwater outfalls, and direct runoff
  - tide and other water level fluctuations
  - estuarine circulation resulting from density differences between seawater and freshwater as well as temperature differences

It then feeds information to the sediment transport and contaminant fate and transport models.

- The **sediment transport model** uses model information on sediment in the water column and bed, including sediment classes, erosion properties, settling, and navigation traffic to simulate the fate and transport of sediments from various sources, including the East River and point source loadings. It then feeds information to the contaminant fate and transport model.
- The **contaminant fate and transport model** uses model information on water column and bed contaminants to simulate and make a quantitative evaluation of the fate and transport of contaminants from various sources. It then feeds information to the bioaccumulation model.
- The bioaccumulation model aims to calculate contaminant uptake and accumulation in biota through projecting tissue concentrations. The exact details of the model are under development.

This diagram represents the interaction and flow of information among the six model types.



### Status of modeling study components

- The watershed (point source) model, which was developed by New York City for the Long-Term Control Plan (LTCP), is complete.
- Initial versions of the groundwater, hydrodynamic, and sediment transport models were submitted in the draft remedial investigation (RI) in 2016. Revised versions are expected in the revised RI in April 2019.
- The contaminant fate and transport model is under development; an initial version is expected in December 2019.
- The bioaccumulation model is under development; an initial version is expected in March 2020.

### Model applications for feasibility study (FS)

The models are used to make projections for various management alternatives, using the comparison of several metrics such as sediment concentration or fish tissue concentration to evaluate their effectiveness against each other and a baseline no-remediation scenario.

### Discussion and questions on the model

CAG members asked the following questions. *Direct responses from EPA staff and consultants are in italics.*

- Because the models work in a sequence, are errors in early models magnified throughout the process?
  - *Yes, uncertainties magnify as you go through the models. This contributes to the model limitations, and is part of why we have more confidence in relative rather than absolute comparisons in the model. The model is one among multiple lines of evidence used, including empirical data. For example, by collecting sediment at various points of time we can see what rate of contamination or decontamination is occurring.*
- Who is doing the modeling?
  - *The hands-on work is being done by Anchor QEA under the supervision of EPA. New York City also has input into the process.*
- The model is as good as the data it stands on. I've heard that we're only looking at data within the waterway. What collaboration between the state and federal agencies is occurring for data collection to be sure that models are robust?
  - *We are using all EPA-approved data. DEC data will be submitted to EPA to review, and EPA will determine if the data is appropriate to use. DEC is collecting upland source data, and EPA is coordinating with DEC to get that information.*
- Are these models being calibrated, including the bioaccumulation model? Sampling tissue for the bioaccumulation model seems like it would be more difficult.
  - *Yes. The bioaccumulation model will also be calibrated to tissue data, which was collected as part of phase 2 in 2015.*
- Some sites are older and have been investigated thoroughly, while others are more recent and have ongoing investigations. There is a concern that some are still seeping into the Creek, and those should be a high priority to address. The model seems to do a

lot to simulate the impacts of stormwater, CSOs, the East River, etc., and put less emphasis on sources of contamination right on the Creek. Potential contamination coming from the East River seems like background noise, particularly considering past conversations where it has been established that the East River flows really diminish as you travel up the Creek.

- *The model is being set up with existing patterns of contamination and sedimentation to examine the transport and erosion of sediments. The influence of the East River is significant because it is a dominant source of sediments to the system. Major hot spots are where the East River's influence decreases.*
- Ebullition and aeration were not mentioned and are not being addressed as transport mechanisms. These factors should be acknowledged. If these were difficult to model, what reassurance can you provide that they are not a significant contributor to the system?
  - *Ebullition has never been accounted for in any kind of model, so there are some limitations on what can be done numerically. One could empirically compare the contribution of ebullition to other sources. One could quantify those ebullition contributions and make a determination if they were significant enough to incorporate in a model.*
- There is a concern that DEC is not properly systematically sampling to determine the movement of material in the Creek, for example coal tar movement at the National Grid site. What kind of data collection is going to inform models about this system if the monitoring is inadequate?
  - *DEC has their own RI on certain properties. We defer to DEC as a first line. If sampling were proven to be inadequate, EPA would work with DEC to assure it met standards. No one wants contamination. We are still gathering data, and have not made a determination whether EPA needs to step in.*
- How does the complexity of modeling this system compare to other sites?
  - *In terms of sources, this is the most complicated I have seen. Point source and groundwater are additional models beyond the four typically used at sites. NAPL and ebullition are beyond the science we have to create models.*
- What level of confidence should we have in this model given the uncertainties?
  - *A tremendous amount of data has been collected. There are some uncertainties, for example NAPL and ebullition. But there is enough to create a good model, which will be one line of evidence. We will not rely on this line of evidence alone. The Newtown Creek Group wanted models so we're doing models. The Gowanus site didn't use any models.*

*We find ourselves comparing Newtown to the Gowanus site because they have similar contaminants and are water bodies in an urban environment. However, they are different. Gowanus is only two miles long, 50 feet wide, and does not have the same navigation issues. The East River impact is not found on the Gowanus Canal. At Newtown Creek, there was the advantage of the Army Corps of Engineers already having done a lot of investigative work. The remedies were*

*easier to determine for Gowanus: CSO capture, dredging, cutoff wall. The remedies will be much more complicated here.*

- The CAG has gone through this and outlined the principles of what we want. We want removal of contaminated sediment. If we know of ongoing sources of contamination – CSOs, NAPL, etc. – are you doing modeling for the reference sites?
  - *Removal of contaminated sediments that pose a risk to people and the environment is always our goal. The model will be helpful because we want to know which remedy will work best. The model gives us a first line of evidence.*
- Does EPA have the authority to say to PRPs that the data collection phase needs to end to move forward in the process?
  - *We are moving things forward. In the next few months we will be having discussions on the feasibility study.*
- The aeration system is totally broken, right near contamination sites. The coal tar at National Grid is near a lot of water movement that is moving everything around. Some acknowledgement and study of it would be good because there is no plan on when it will stop being used. If it is going to run for 50 years it is silly not to account for it.
- What will 20 feet of sea level rise mean for contaminants on the site?
  - *I would expect the impact of climate change to be considered at this site, as it is at other sites. I would expect, qualitatively, that sea level rise would enhance deposition into the system.*
- Does the model account for dynamic changes to tides?
  - *We're not projecting into the future. We have incorporated current sea level rise, which is currently at a rate of about one inch per decade.*

CAG members suggested the following topics of interest to the CAG for future discussion:

- Could you discuss how the model is weighted compared to other lines of evidence? Especially if the model does not account for factors such as aeration, ebullition, and NAPL, we want to know how it is being accounted and weighted elsewhere. We are concerned about the model if it cannot account for significant sources of contamination.
- How do models help you pick the final remedy?
- How much uncertainty surrounds the questions of NAPL, ebullition, and aeration? What do we need to know to make informed decisions?
- What is the flow of water in the tributaries? At what point is the East River no longer an influence? Can you show tidal influence with the models?

The meeting was adjourned at 8:15 PM.