Figure 4-1: Past, present and future timeframes of Newark Bay which represent the changes to the bathymetry and shoreline.
Figure 4-2: Historic Sediment Deposition in Newark Bay
Figure 4-3
Dredge Model Sub-areas
MIKE3 results presented for individual model cells
*Sediment chemistry evaluation not performed for HDP channels, which are indicated in gray, see text.
(4) Contaminant concentrations in the DM ($C_{DM}$, mg/kg)

(5) Contaminant concentrations in the existing surface sediments ($C_{ss}$, mg/kg)

(2) Transport

(3) Deposition ($D_{DM}$, mm)

(1) Resuspension

$D_{core} = D_{DM} + D_{SS}$

$C_{post-dredging} = \frac{1}{D_{core}} \left[D_{DM} C_{DM} + (D_{core} - D_{DM}) C_{SS}\right]$
2,3,7,8 TCDD (ng/kg)
Depth Weighted Estimate
- < 10
- 10 to 50
- 50 to 100
- 100 to 200
- > 200

Surface Sediments
- < 10
- 10 to 50
- 50 to 100
- 100 to 200
- > 200

Dredge Areas

Impact Areas

Figure 4-6
2,3,7,8 TCDD in the sediments of Newark Bay under current conditions: Thiessen polygons
Figure 4-7. Field duplicates in the NBSA RI/FS Phase 1 Data Set: Relative Percent Differences
2,3,7,8 TCDD (ng/kg)  
Current Surface Concentrations
- < 10
- 10 to 50
- 50 to 100
- 100 to 200
- > 200

2,3,7,8 TCDD (ng/kg)  
Post Dredge Surface Concentrations
- < 10
- 10 to 50
- 50 to 100
- 100 to 200
- > 200

Figure 4-8a  
2,3,7,8 TCDD: comparison of existing surface sediment concentrations with post HDP concentrations predicted by the model
2,3,7,8 TCDD (ng/kg) Concentration Difference

- < -5
- -5 to -1
- -1 to 1
- 1 to 5
- > 5

Figure 4-8b.
2,3,7,8 TCDD: change in surface sediment concentrations due to dredging as predicted by the model
Figure 4-8c. 2,3,7,8 TCDD : Predicted changes in surface sediment concentrations that are greater than the uncertainty threshold

Predicted changes were greater than the uncertainty threshold in points colored pink. Dashed line represents the boundaries of the uncertainty threshold. See text for more details.
Total PCBs: comparison of existing surface sediment concentrations with post HDP concentrations predicted by the model.

**Current Surface Concentrations**
- < 0.05
- 0.05 to 0.5
- 0.5 to 1
- 1 to 2
- > 2

**Post Dredge Surface Concentrations**
- < 0.05
- 0.05 to 0.5
- 0.5 to 1
- 1 to 2
- > 2

Figure 4-9a: Total PCBs: comparison of existing surface sediment concentrations with post HDP concentrations predicted by the model.
Total PCBs (mg/kg)
Concentration Difference

- < -0.025
- -0.025 to -0.005
- -0.005 to 0.005
- 0.005 to 0.025
- > 0.025

Figure 4-9b.
Total PCBs: change in surface sediment concentrations due to dredging as predicted by the model
Figure 4-9c. Total PCBs: Predicted changes in surface sediment concentrations that are greater than the uncertainty threshold

Predicted changes were greater than the uncertainty threshold in points colored pink. Dashed line represents the boundaries of the uncertainty threshold. See text for more details.
Figure 4-10a
DDTs: comparison of existing surface sediment concentrations with post HDP concentrations predicted by the model
DDTs (mg/kg)
Concentration Difference
- < -0.005
- -0.005 to -0.001
- -0.001 to 0.001
- 0.001 to 0.005
- > 0.005

Figure 4-10b.
DDTs: change in surface sediment concentrations due to dredging as predicted by the model
Figure 4-10c. DDT: Predicted changes in surface sediment concentrations that are greater than the uncertainty threshold

Predicted changes were greater than the uncertainty threshold in points colored pink. Dashed line represents the boundaries of the uncertainty threshold. See text for more details.
Benzo(a)pyrene (mg/kg)
Current Surface Concentrations
- < 0.4
- 0.4 to 0.7
- 0.7 to 1.5
- 1.5 to 3
- > 3

Benzo(a)pyrene (mg/kg)
Post Dredge Surface Concentrations
- < 0.4
- 0.4 to 0.7
- 0.7 to 1.5
- 1.5 to 3
- > 3

**Figure 4-11a**
Benzo(a)pyrene: comparison of existing surface sediment concentrations with post HDP concentrations predicted by the model
Benzo(a)pyrene (mg/kg)
Concentration Difference

- < -0.2
- -0.2 to -0.04
- -0.04 to 0.04
- 0.04 to 0.2
- > 0.2

Figure 4-11b
Benzo(a)pyrene: change in surface sediment concentrations due to dredging as predicted by the model
Figure 4-11c. Benzo(a)pyrene: Predicted changes in surface sediment concentrations that are greater than the uncertainty threshold

Predicted changes were greater than the uncertainty threshold in points colored pink. Dashed line represents the boundaries of the uncertainty threshold. See text for more details.
Figure 4-12a
Mercury: comparison of existing surface sediment concentrations with post HDP concentrations predicted by the model.

Mercury (mg/kg)
Current Surface Concentrations
- < 1
- 1 to 2
- 2 to 4
- 4 to 8
- > 8

Mercury (mg/kg)
Post Dredge Surface Concentrations
- < 1
- 1 to 2
- 2 to 4
- 4 to 8
- > 8
Mercury (mg/kg)
Concentration Difference

- < -0.5
- -0.5 to -0.1
- -0.1 to 0.1
- 0.1 to 0.5
- > 0.5

Figure 4-12b
Mercury: change in surface sediment concentrations due to dredging as predicted by the model
Figure 4-12c. Mercury: Predicted changes in surface sediment concentrations that are greater than the uncertainty threshold

*Predicted changes were greater than the uncertainty threshold in points colored pink. Dashed line represents the boundaries of the uncertainty threshold. See text for more details.*
Figure 4-13a
Chromium: comparison of existing surface sediment concentrations with post HDP concentrations predicted by the model
Chromium (mg/kg)
Concentration Difference

- < -25
- -25 to -5
- -5 to 5
- 5 to 25
- > 25

Figure 4-13b
Chromium: change in surface sediment concentrations due to dredging as predicted by the model
Figure 4-13c. Chromium: Predicted changes in surface sediment concentrations that are greater than the uncertainty threshold

Predicted changes were greater than the uncertainty threshold in points colored pink. Dashed line represents the boundaries of the uncertainty threshold. See text for more details.
2,3,7,8 TCDD (ng/kg)
Current Surface Concentrations

- < 10
- 10 to 50
- 50 to 100
- 100 to 200
- > 200

Post Dredge Surface Concentrations

- < 10
- 10 to 50
- 50 to 100
- 100 to 200
- > 200

Figure 4-14a
2,3,7,8 TCDD: comparison of existing surface sediment concentrations with post dredging concentrations predicted by the model, AEC analysis.
2,3,7,8 TCDD (ng/kg)
Concentration Difference
- < -5
- -5 to -1
- -1 to 1
- 1 to 5
- > 5

Figure 4-14b
2,3,7,8 TCDD: change in surface sediment concentrations due to dredging as predicted by the model, AEC analysis
Figure 4-14c. 2,3,7,8 TCDD: Predicted changes in surface sediment concentrations that are greater than the uncertainty threshold, AEC analysis

*Predicted changes were greater than the uncertainty threshold in points colored pink. Dashed line represents the boundaries of the uncertainty threshold. See text for more details.*
Total PCBs (mg/kg)
Current Surface Concentrations

- < 0.05
- 0.05 to 0.5
- 0.5 to 1
- 1 to 2
- > 2

Total PCBs (mg/kg)
Post Dredge Surface Concentrations

- < 0.05
- 0.05 to 0.5
- 0.5 to 1
- 1 to 2
- > 2

Figure 4-15a
Total PCBs: comparison of existing surface sediment concentrations with post dredging concentrations predicted by the model, AEC analysis
Total PCBs (mg/kg)
Concentration Difference

- < -0.025
- -0.025 to -0.005
- -0.005 to 0.005
- 0.005 to 0.025
- > 0.025

Figure 4-15b
Total PCBs: change in surface sediment concentrations due to dredging as predicted by the model, AEC analysis
Figure 4-15c. Total PCBs: Predicted changes in surface sediment concentrations that are greater than the uncertainty threshold, AEC analysis

*Predicted changes were greater than the uncertainty threshold in points colored pink. Dashed line represents the boundaries of the uncertainty threshold. See text for more details.*
DDTs: comparison of existing surface sediment concentrations with post-dredging concentrations predicted by the model, AEC analysis.

Current Surface Concentrations
- < 0.01
- 0.01 to 0.05
- 0.05 to 0.1
- 0.1 to 0.2
- > 0.2

Post Dredge Surface Concentrations
- < 0.01
- 0.01 to 0.05
- 0.05 to 0.1
- 0.1 to 0.2
- > 0.2

Figure 4-16a
DDTs (mg/kg)
Concentration Difference

- < -0.005
- -0.005 to -0.001
- -0.001 to 0.001
- 0.001 to 0.005
- > 0.005

Figure 4-16b
DDTs: change in surface sediment concentrations due to dredging as predicted by the model, AEC analysis
Figure 4-16c. DDT: Predicted changes in surface sediment concentrations that are greater than the uncertainty threshold, AEC analysis

Predicted changes were greater than the uncertainty threshold in points colored pink. Dashed line represents the boundaries of the uncertainty threshold. See text for more details.
Benzo(a)pyrene (mg/kg)
Current Surface Concentrations

- < 0.4
- 0.4 to 0.7
- 0.7 to 1.5
- 1.5 to 3
- > 3

Benzo(a)pyrene (mg/kg)
Post Dredge Surface Concentrations

- < 0.4
- 0.4 to 0.7
- 0.7 to 1.5
- 1.5 to 3
- > 3

Figure 4-17a
Benzo(a)pyrene: comparison of existing surface sediment concentrations with post dredging concentrations predicted by the model, AEC analysis
Benzo(a)pyrene (mg/kg)
Concentration Difference

- < -0.2
- -0.2 to -0.04
- -0.04 to 0.04
- 0.04 to 0.2
- > 0.2

Figure 4-17b
Benzo(a)pyrene: change in surface sediment concentrations due to dredging as predicted by the model, AEC analysis
Figure 4-17c. Benzo(a)pyrene: Predicted changes in surface sediment concentrations that are greater than the uncertainty threshold, AEC analysis.

Predicted changes were greater than the uncertainty threshold in points colored pink. Dashed line represents the boundaries of the uncertainty threshold. See text for more details.
Figure 4-18a
Mercury: comparison of existing surface sediment concentrations with post dredging concentrations predicted by the model, AEC analysis
Mercury (mg/kg)
Concentration Difference

- < -0.5
- -0.5 to -0.1
- -0.1 to 0.1
- 0.1 to 0.5
- > 0.5

Figure 4-18b
Mercury: change in surface sediment concentrations due to dredging as predicted by the model, AEC analysis
Figure 4-18c. Mercury: Predicted changes in surface sediment concentrations that are greater than the uncertainty threshold, AEC analysis

Predicted changes were greater than the uncertainty threshold in points colored pink. Dashed line represents the boundaries of the uncertainty threshold. See text for more details.
Chromium: comparison of existing surface sediment concentrations with post dredging concentrations predicted by the model, AEC analysis.
Chromium (mg/kg)
Concentration Difference

- < -25
- -25 to -5
- -5 to 5
- 5 to 25
- > 25

Figure 4-19b
Chromium: change in surface sediment concentrations due to dredging as predicted by the model, AEC analysis
Figure 4-19c. Chromium: Predicted changes in surface sediment concentrations that are greater than the uncertainty threshold, AEC analysis

Predicted changes were greater than the uncertainty threshold in points colored pink. Dashed line represents the boundaries of the uncertainty threshold. See text for more details.
Phase II Proposed Sampling Locations

- EPA
- USACE recommended