



Midwest Generation Groundwater Modeling Waukegan, IL

NOVEMBER, 2021

K P R G

ENVIRONMENTAL CONSULTATION & REMEDIATION

KPRG and Associates, Inc.

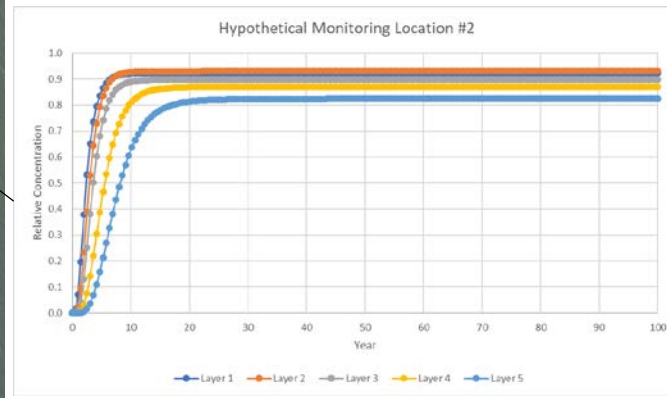
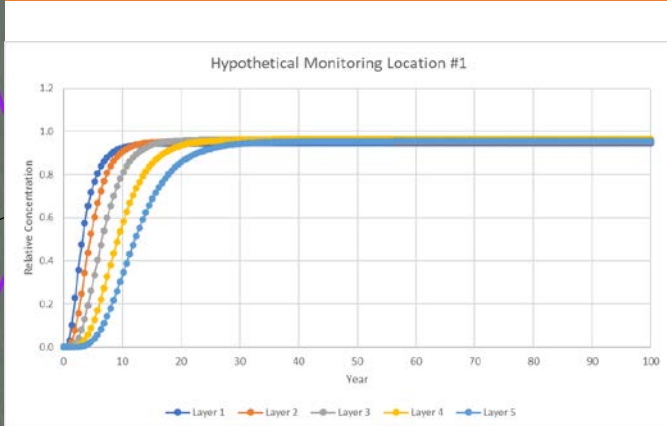
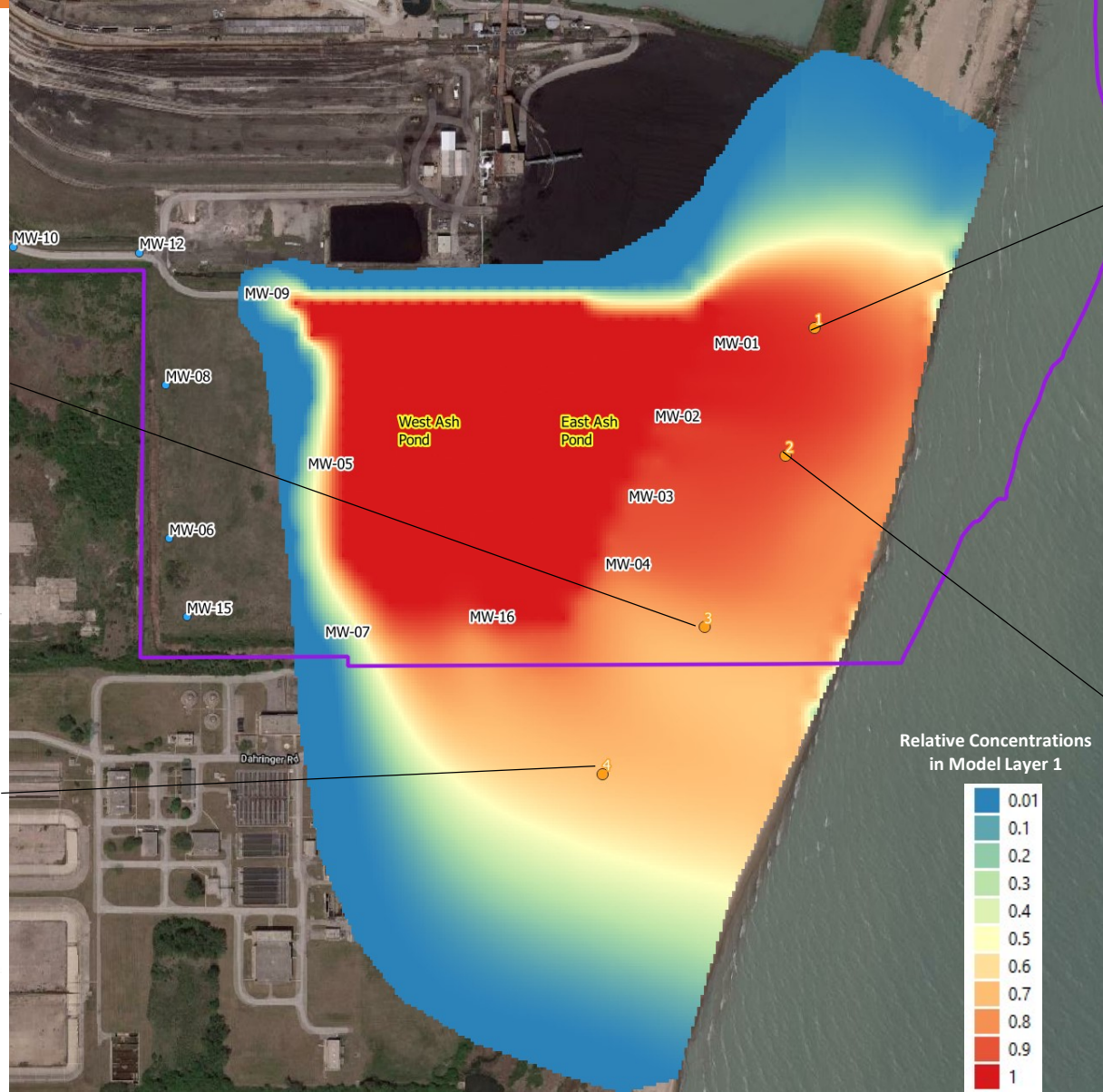
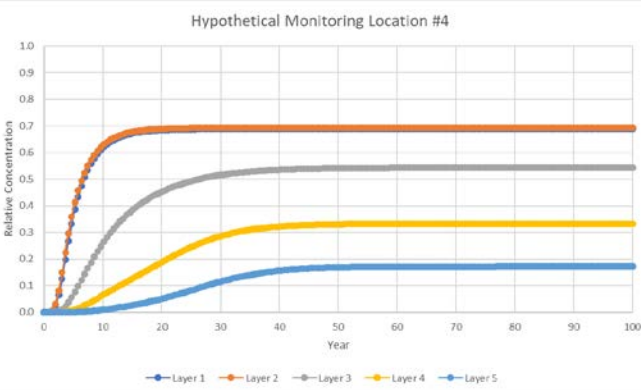
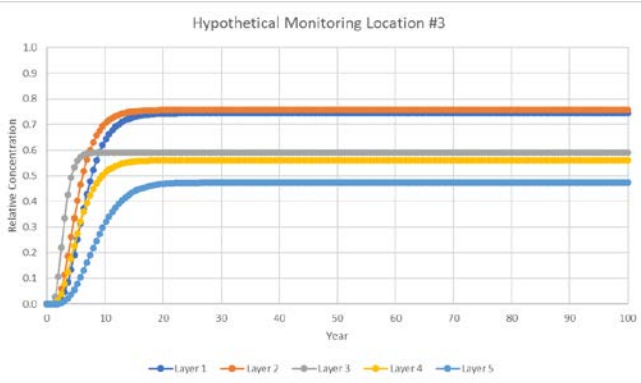
- Starting Conditions:
 - Defined a surrogate source of “1” beneath Ash Ponds, forward run for 100 years with advection and dispersion (=1 as in LSQ modeling)
- Model Scenarios:
 - Initial conditions: the calibrated, steady-state flow system and the 100-year equilibrated mass from the constant source model run:
 1. Closure by removal: Remove the source. Assume the liners are removed, assign natural/background recharge to pond footprint. Run for 100 years.
 2. Closure by removal: Remove the source. Assume the liner beneath the east pond is removed and assign natural/background recharge to east pond footprint. Assume a liner on the west pond with a vertical permeability of 10^{-13} cm/s, assign recharge 5 OM < background. Run for 100 years.
 3. Closure by capping: Dewater ash, cover ash with cap system. Assign low recharge through the pond footprints to represent a cap. Assume cap has vertical permeability of 10^{-13} cm/s, assign recharge 5 OM < background. Run for 100 years.
 4. Closure by removal for the west pond, Closure by capping for the east pond: Remove the source from beneath the west pond, assume a liner on the west pond with a vertical permeability of 10^{-13} cm/s, assign recharge 5 OM < background. Dewater ash within the east pond, cover with cap system, assume cap has vertical permeability of 10^{-13} cm/s, assign low (5 OM < background) recharge through east pond footprint. Run for 100 years.

*OM = orders of magnitude

Model Scenarios Starting Conditions

DRAFT

- Starting Conditions: Defined a surrogate source of "1" beneath Ash Ponds, forward run for 100 years with advection and dispersion



Model Scenario #1

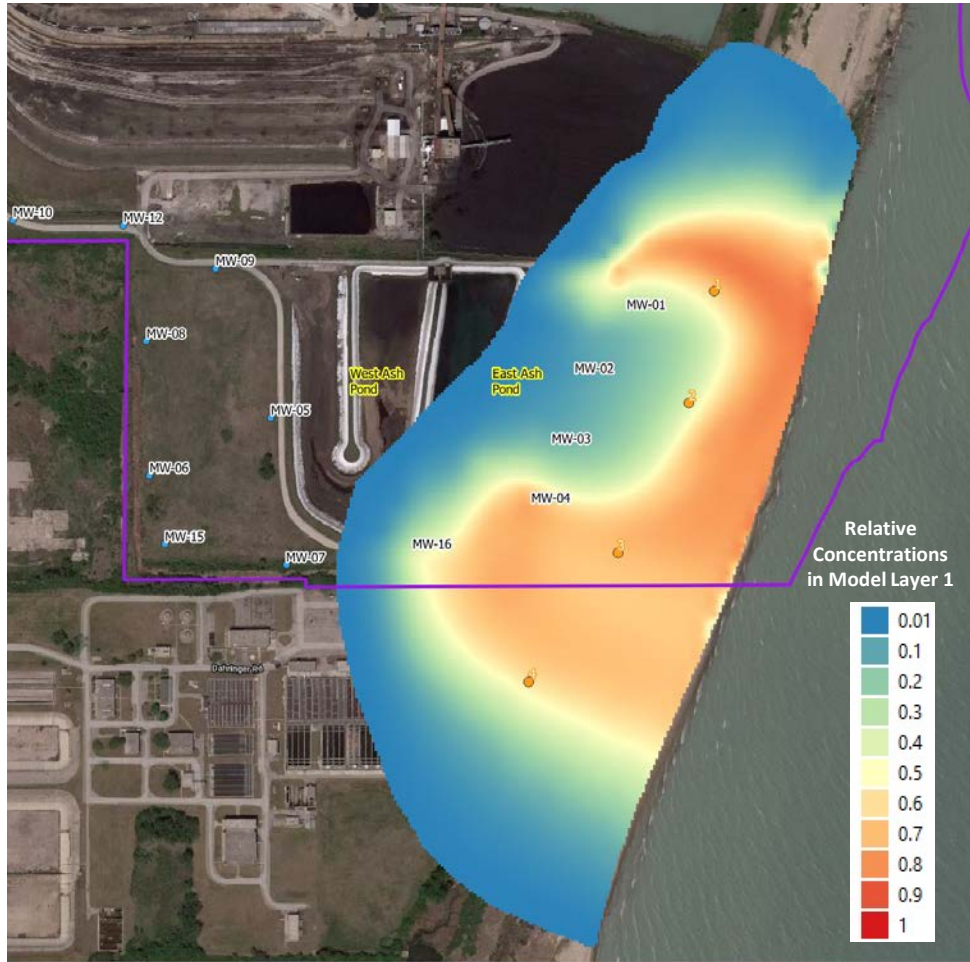
DRAFT

- Model Scenarios:
 - Initial conditions: the calibrated, steady-state flow system and the 100-year equilibrated mass from the constant source model run:
 1. Closure by removal: Remove the source. Assume the liners are removed, assign natural/background recharge to pond footprint. Run for 100 years.

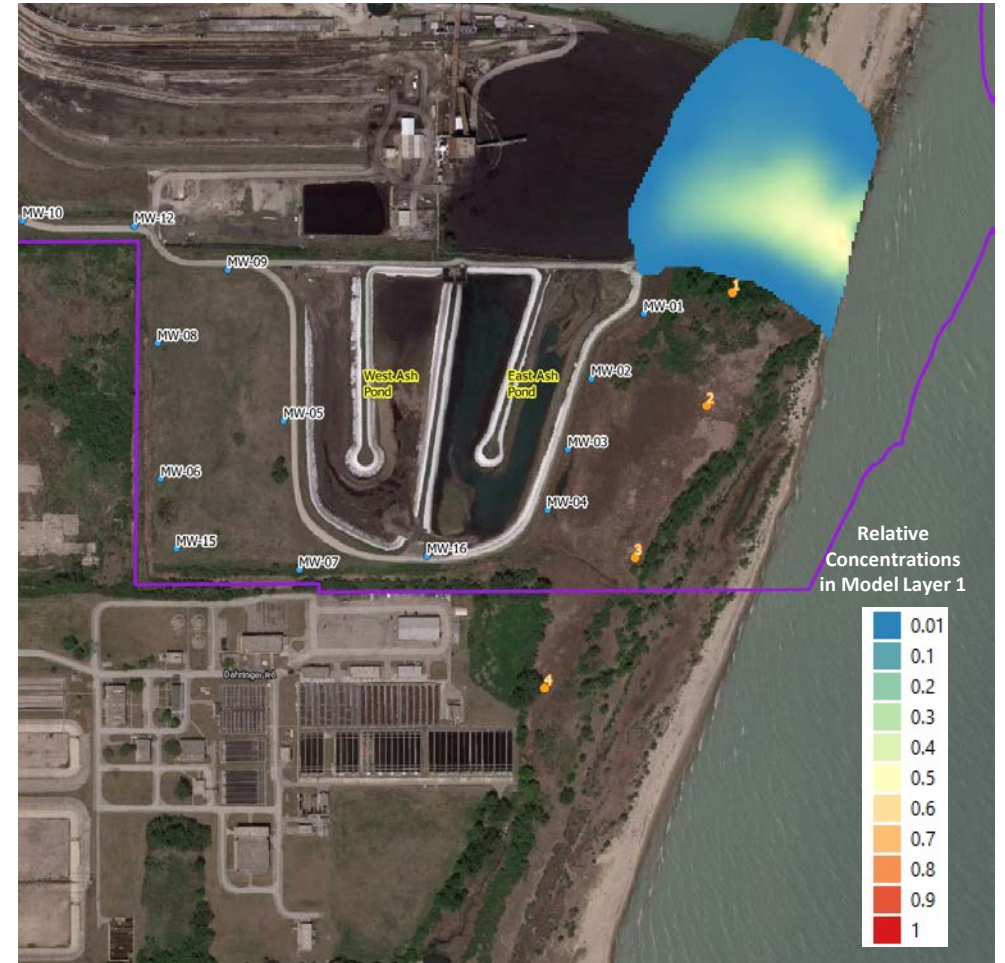
5- and 25-year plume distributions

DRAFT

5 YEAR, Model Layer 1, Scenario 1



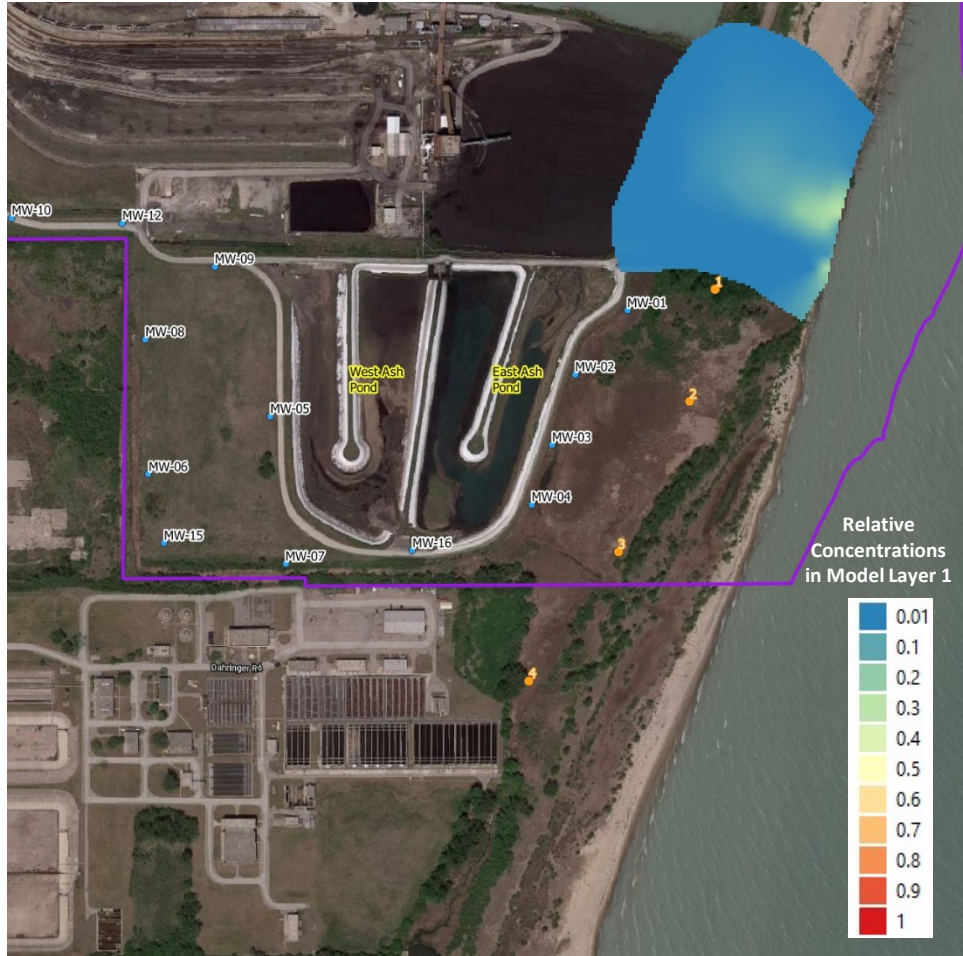
25 YEAR, Model Layer 1, Scenario 1



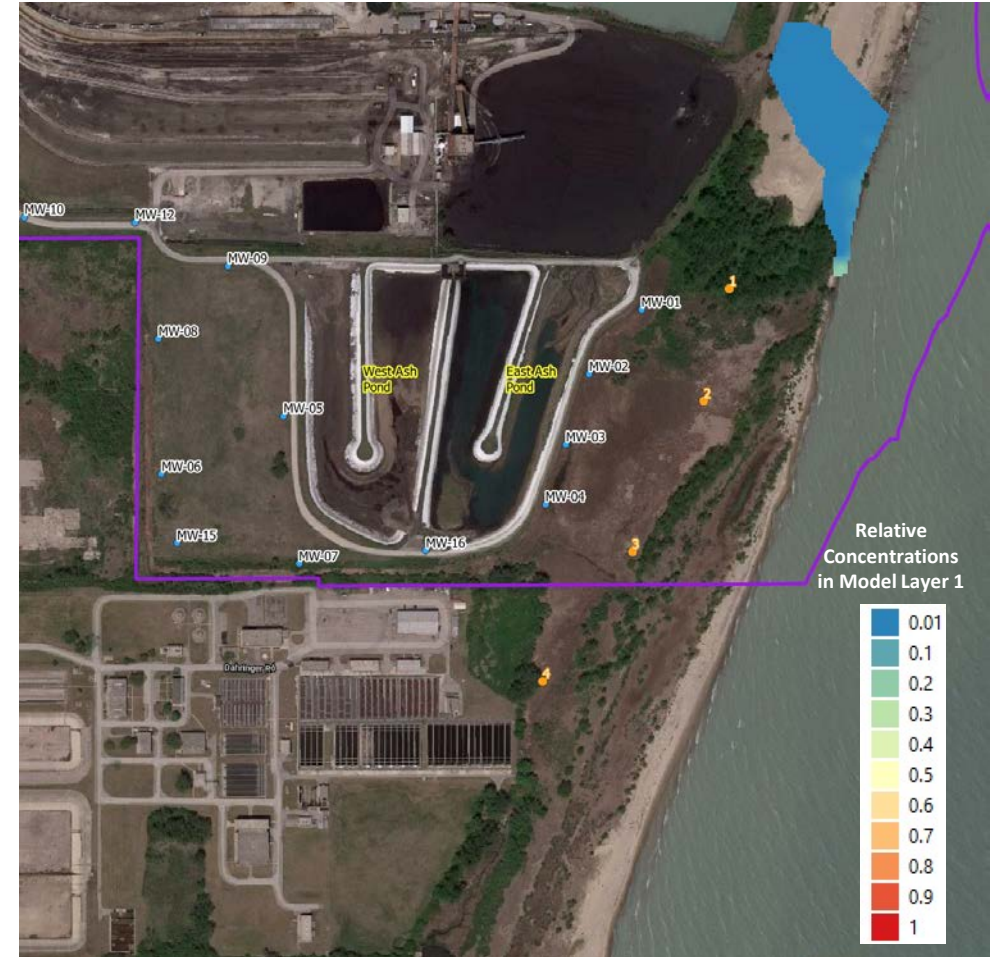
50- and 100-year plume distributions

DRAFT

50 YEAR, Model Layer 1, Scenario 1



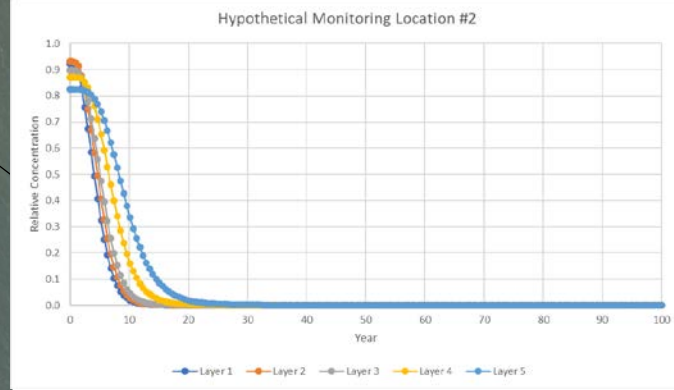
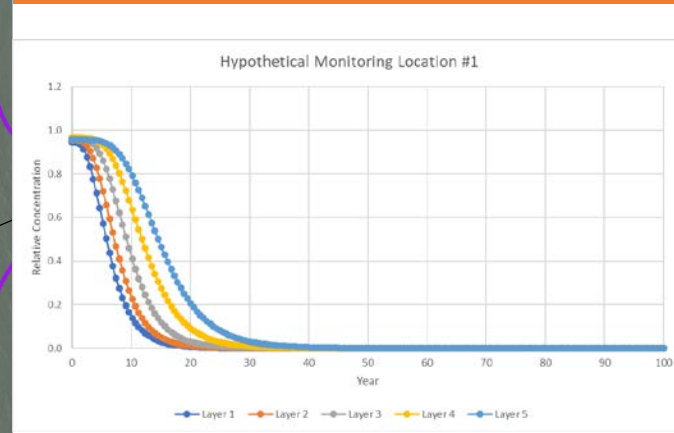
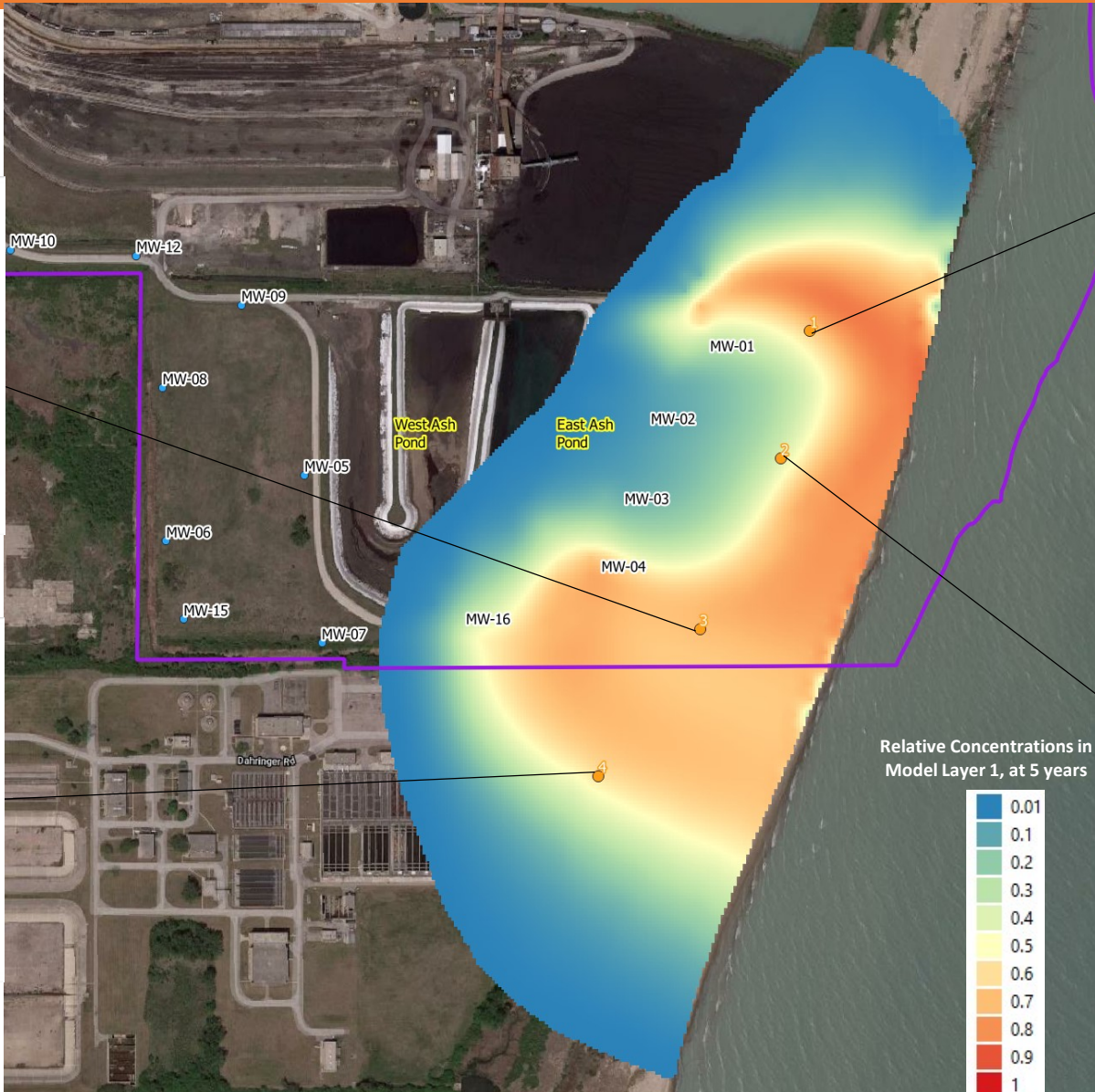
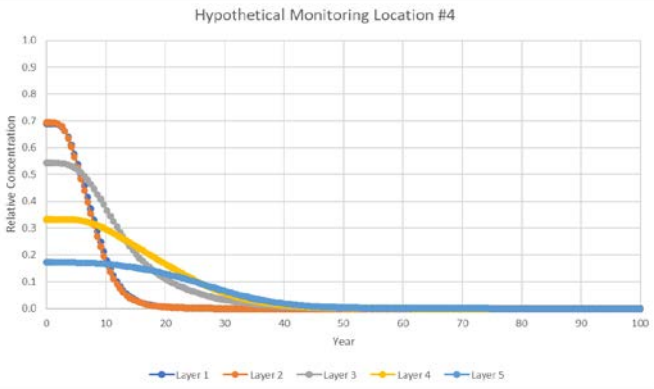
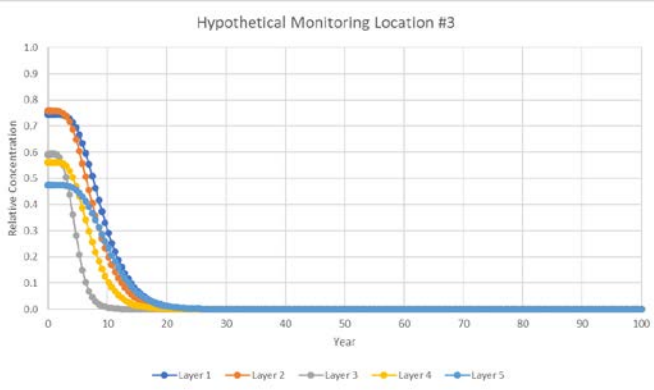
100 YEAR, Model Layer 1, Scenario 1



Model Scenario #1

DRAFT

- Starting Conditions: Constant source distribution at 100 years

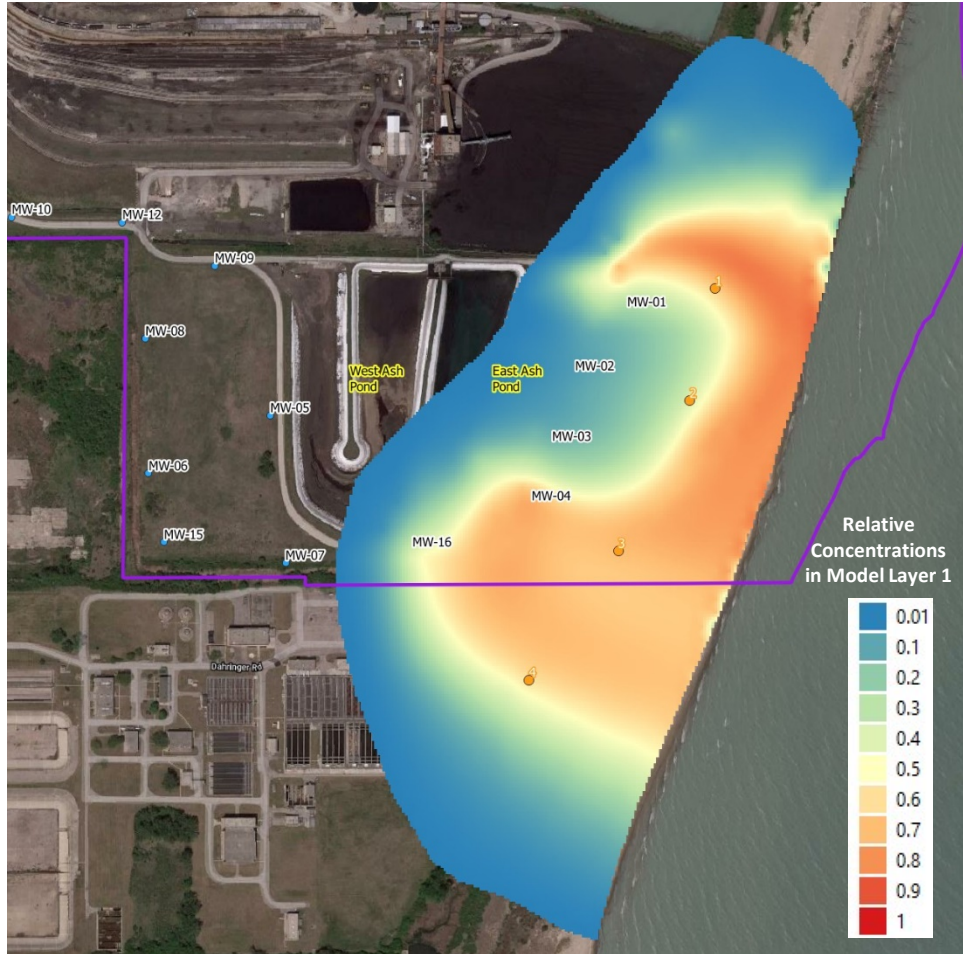


- Model Scenarios:
 - Initial conditions: the calibrated, steady-state flow system and the 100-year equilibrated mass from the constant source model run:
 2. Closure by removal: Remove the source. Assume the liner beneath the east pond is removed and assign natural/background recharge to east pond footprint. Assume a liner on the west pond with a vertical permeability of 10^{-13} cm/s, assign recharge 5 OM < background. Run for 100 years.

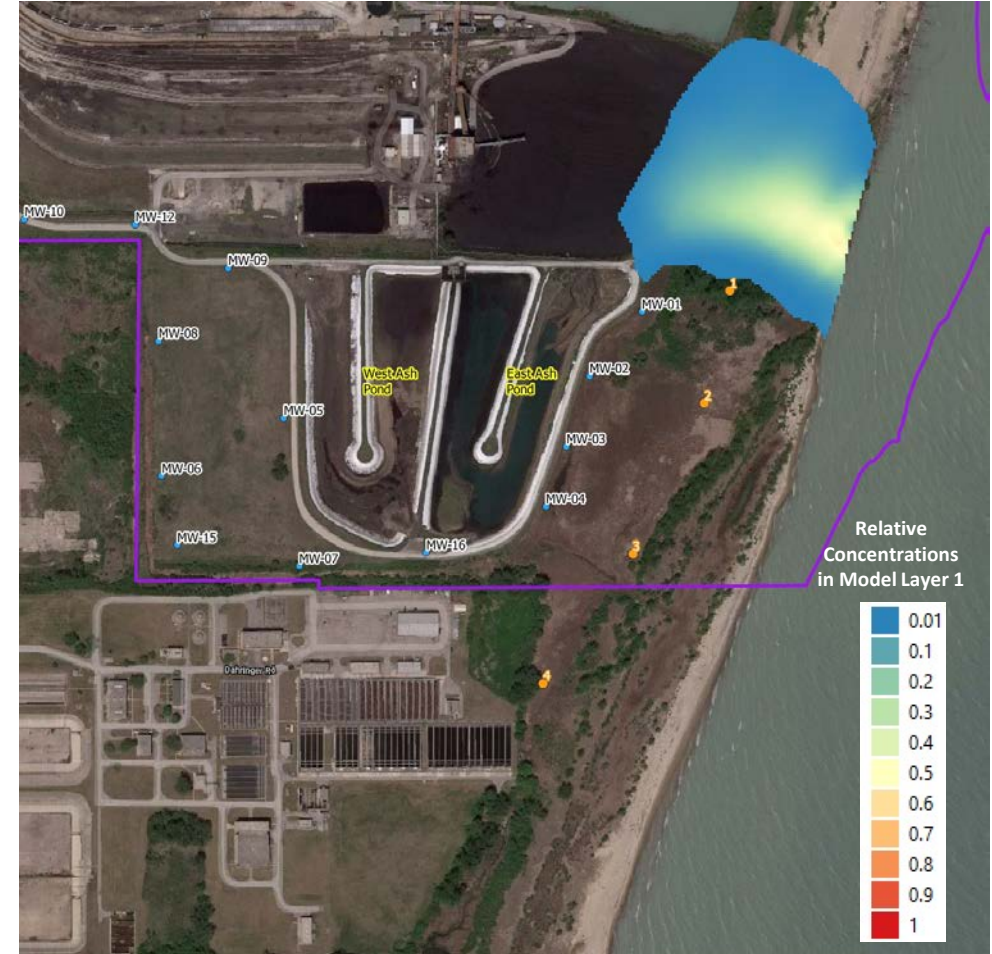
5- and 25-year plume distributions

DRAFT

5 YEAR, Model Layer 1, Scenario 2



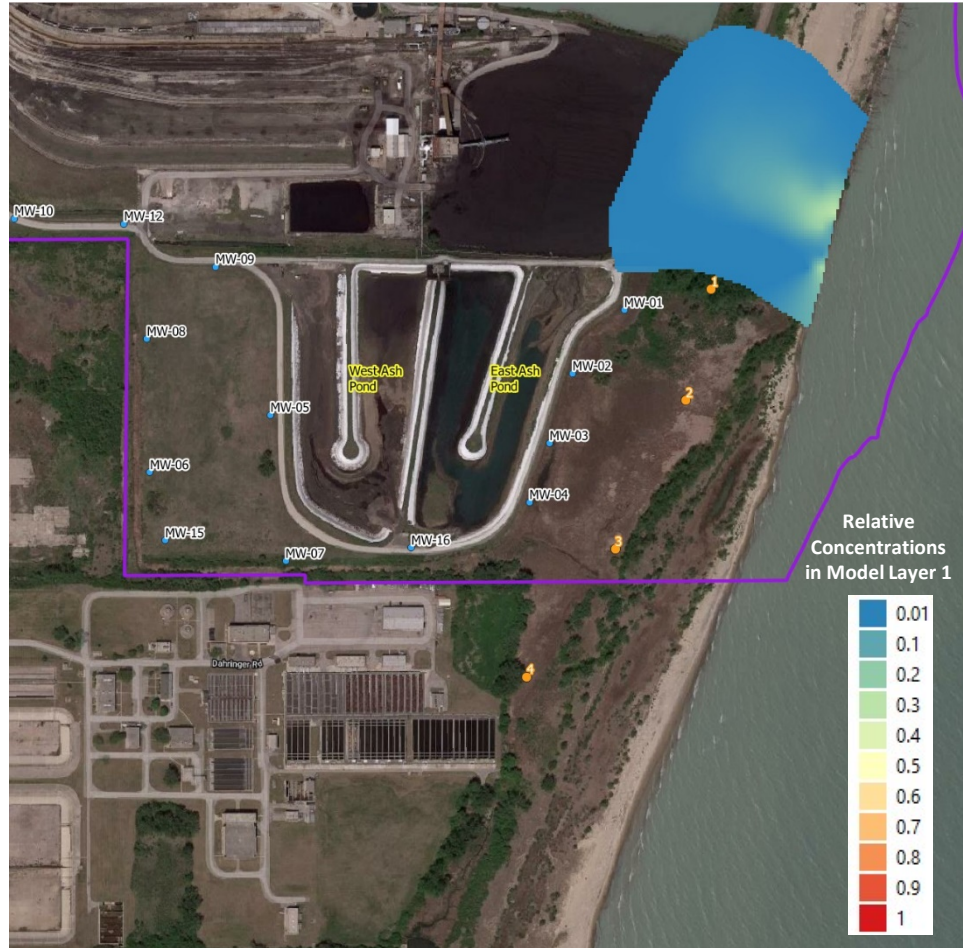
25 YEAR, Model Layer 1, Scenario 2



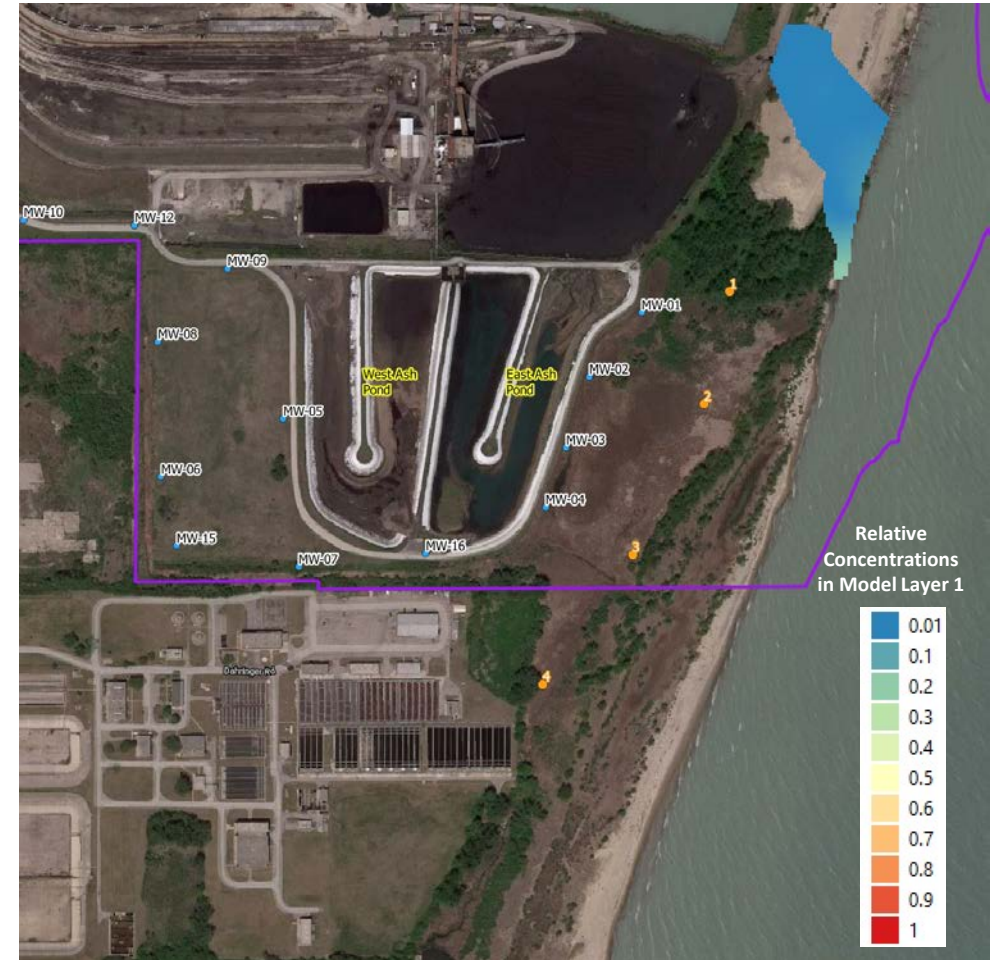
50- and 100-year plume distributions

DRAFT

50 YEAR, Model Layer 1, Scenario 2



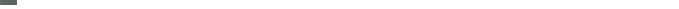
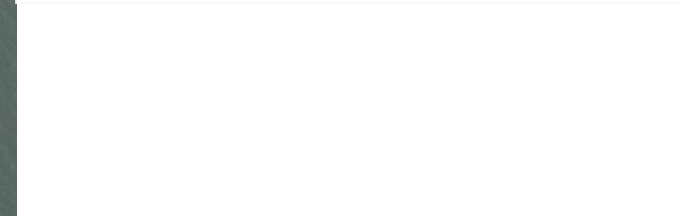
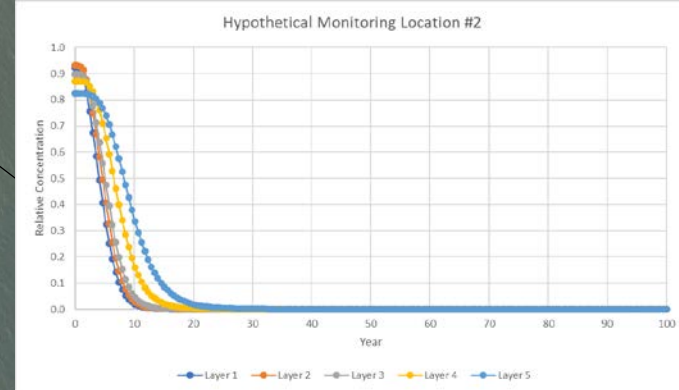
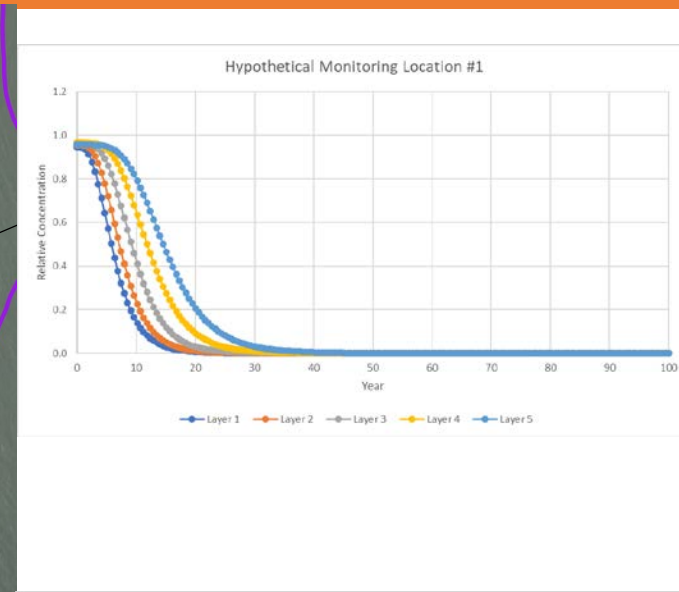
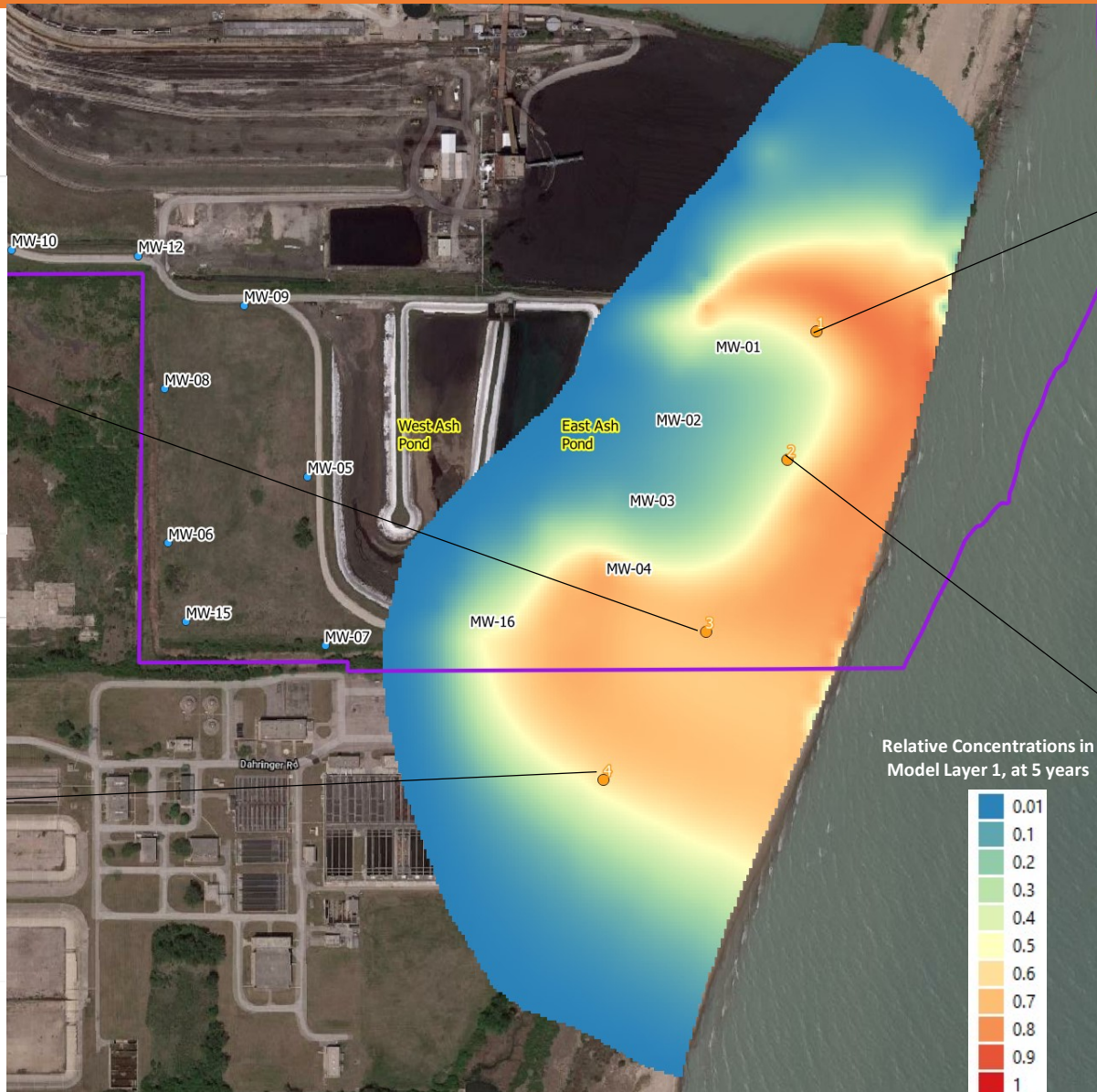
100 YEAR, Model Layer 1, Scenario 2



Model Scenario #2

DRAFT

- Starting Conditions: Constant source distribution at 100 years

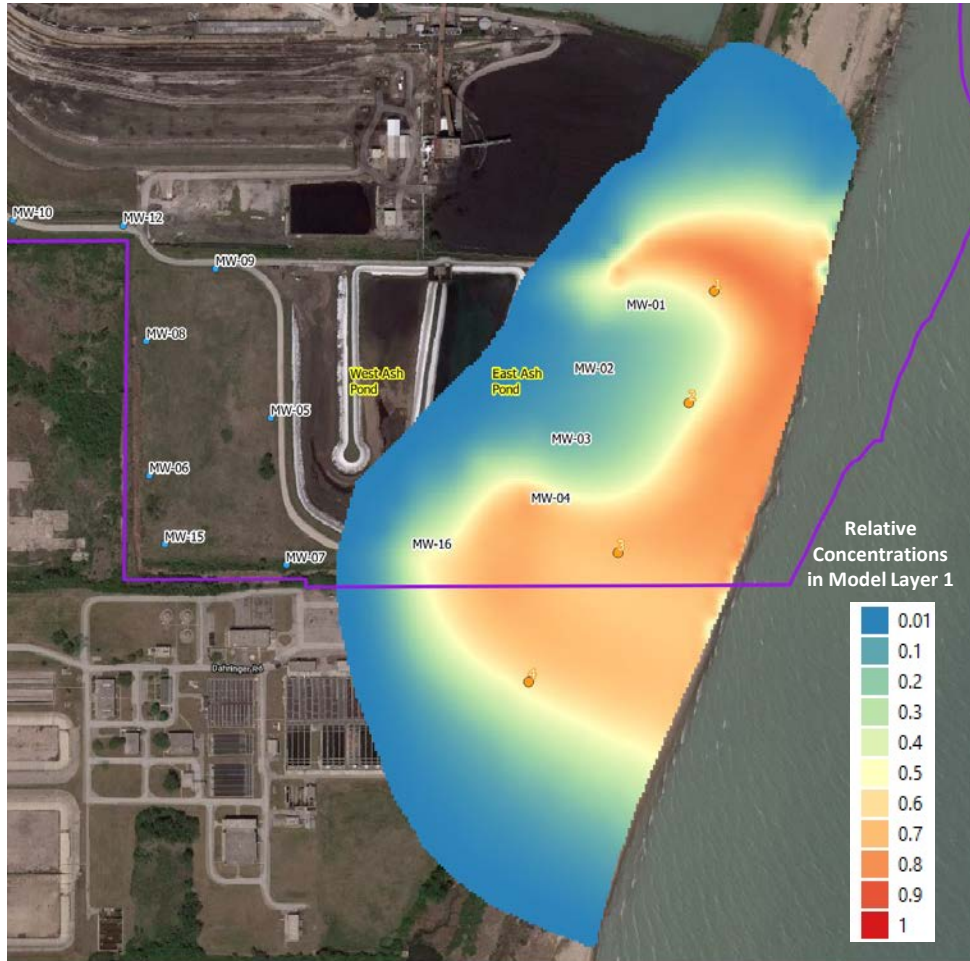


- Model Scenarios:
 - Initial conditions: the calibrated, steady-state flow system and the 100-year equilibrated mass from the constant source model run:
 3. Closure by capping: Hydraulically isolate (dewater ash) the source from the water table. Both pond liners remain. Assign low recharge through the pond footprints to represent a cap. Assume cap has vertical permeability of 10^{-13} cm/s, assign recharge 5 OM < background. Run for 100 years.

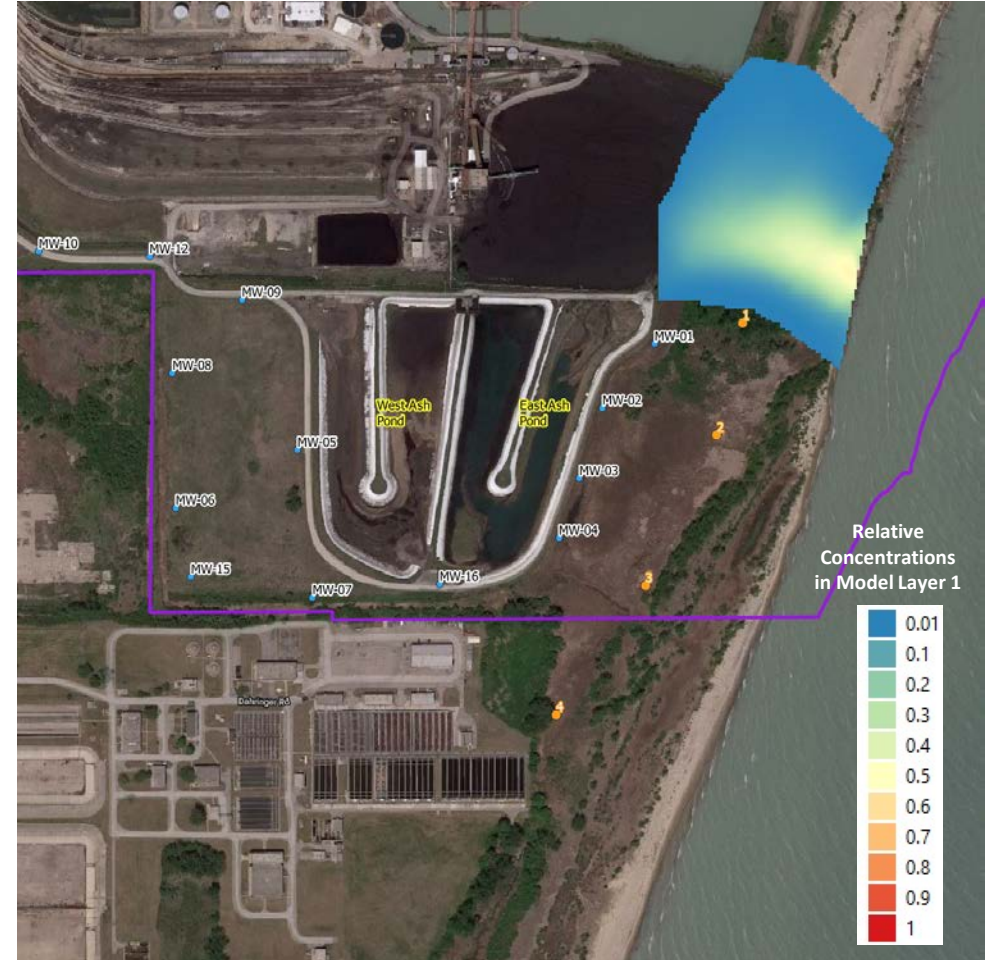
5- and 25-year plume distributions

DRAFT

5 YEAR, Model Layer 1, Scenario 3



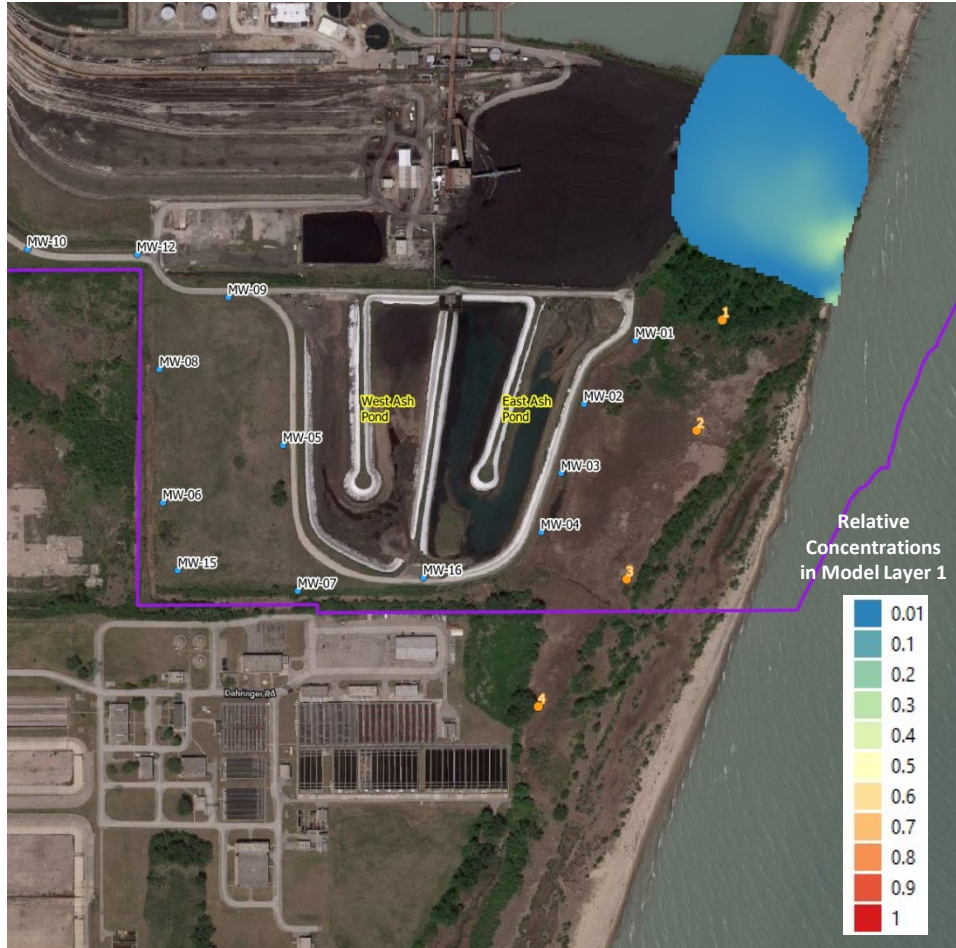
25 YEAR, Model Layer 1, Scenario 3



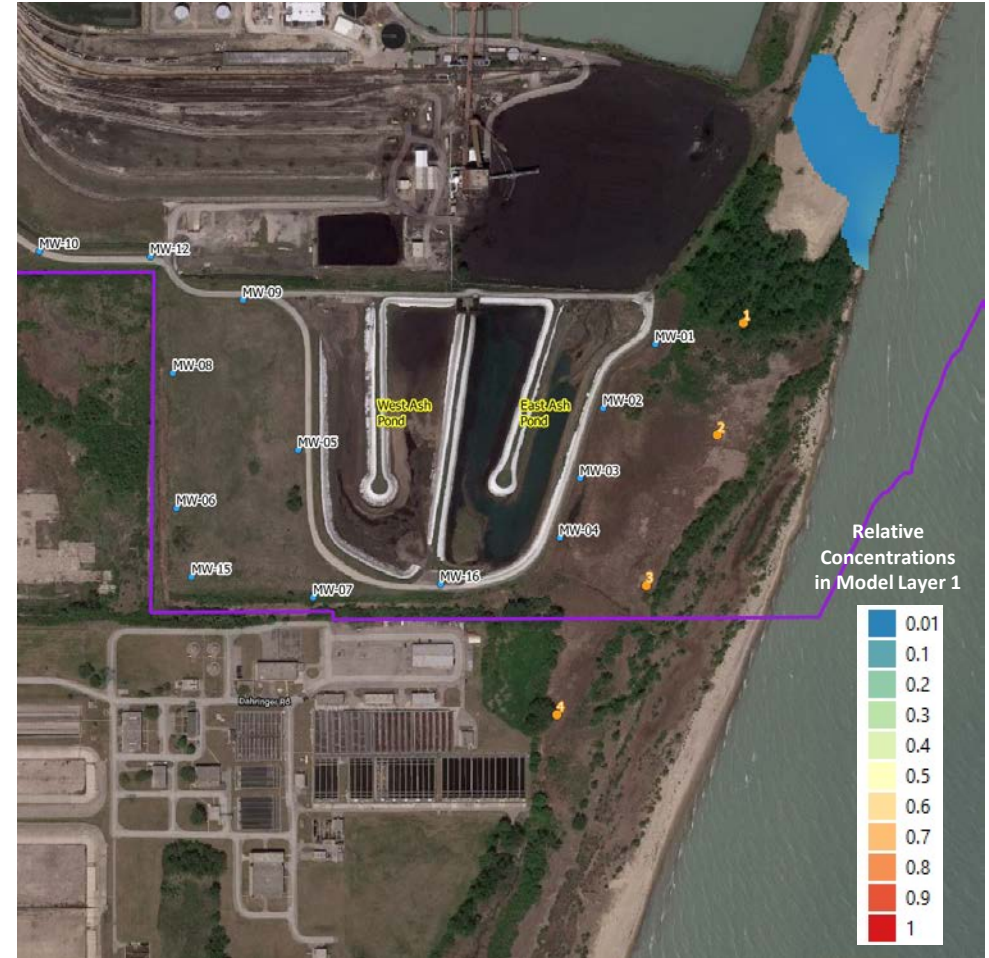
50- and 100-year plume distributions

DRAFT

50 YEAR, Model Layer 1, Scenario 3



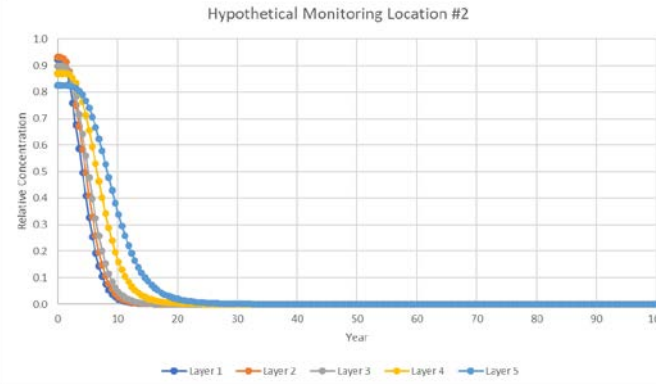
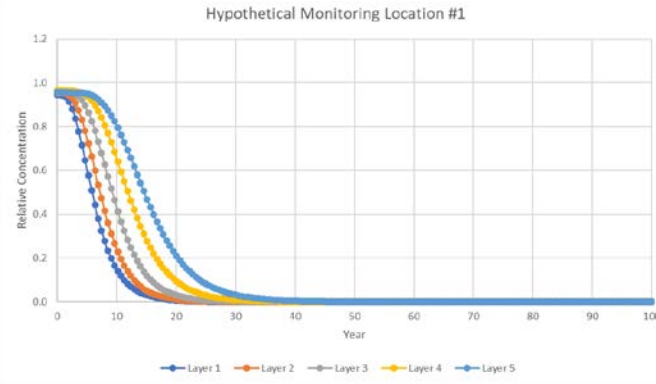
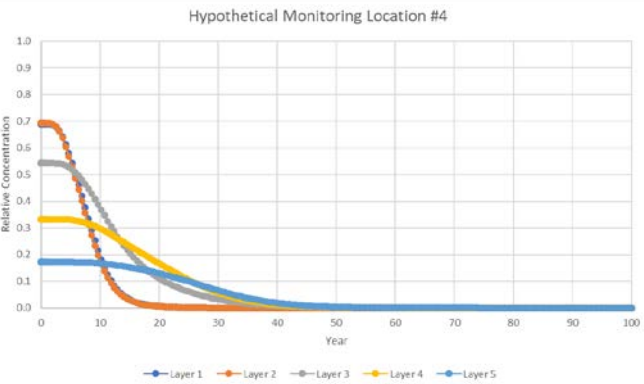
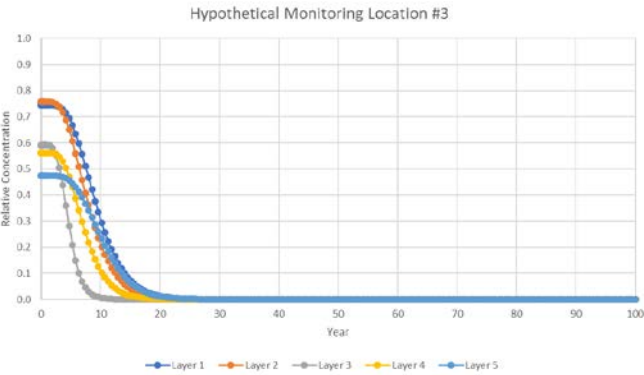
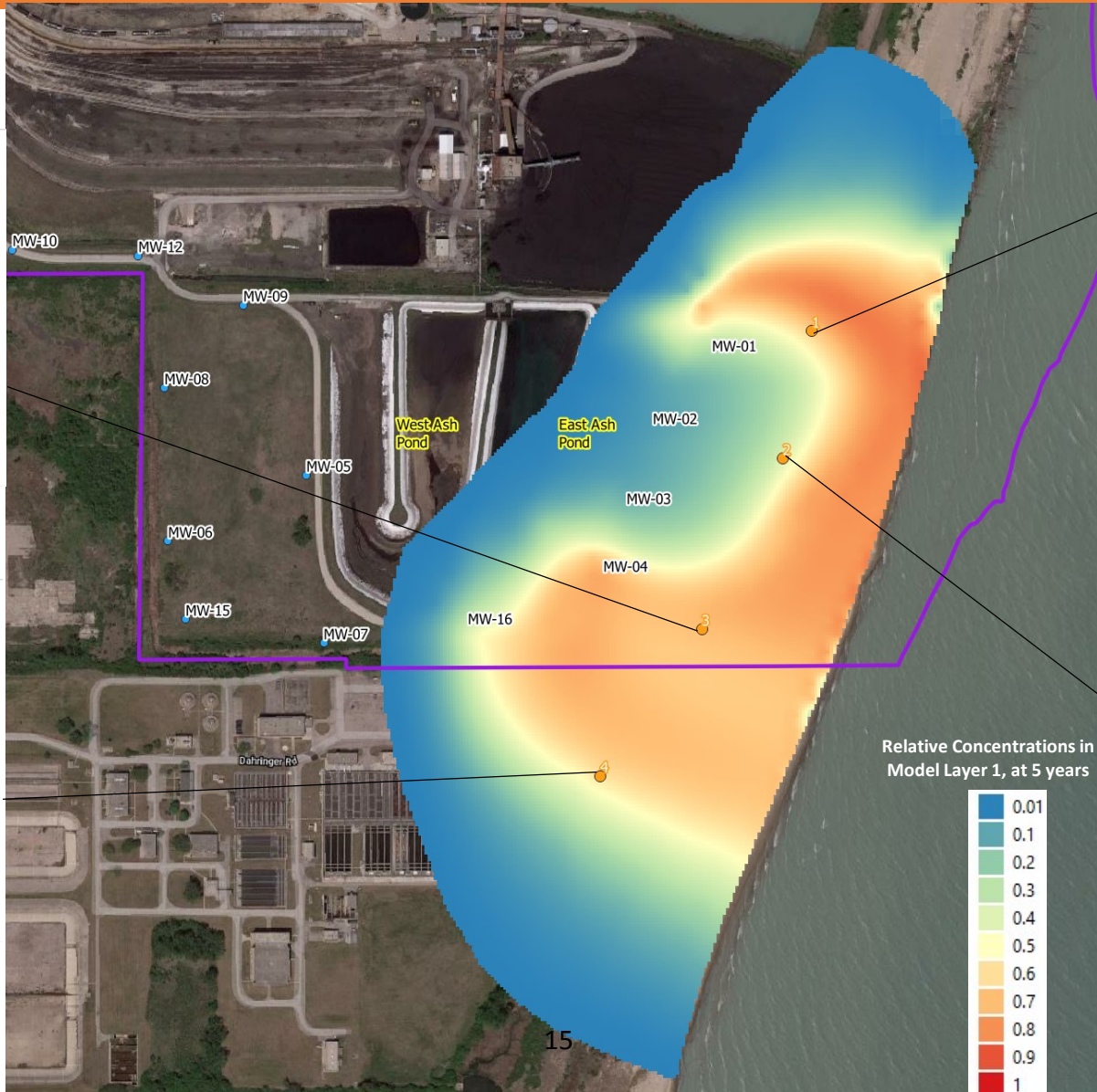
100 YEAR, Model Layer 1, Scenario 3



Model Scenario #3

DRAFT

Starting Conditions: Constant source distribution at 100 years

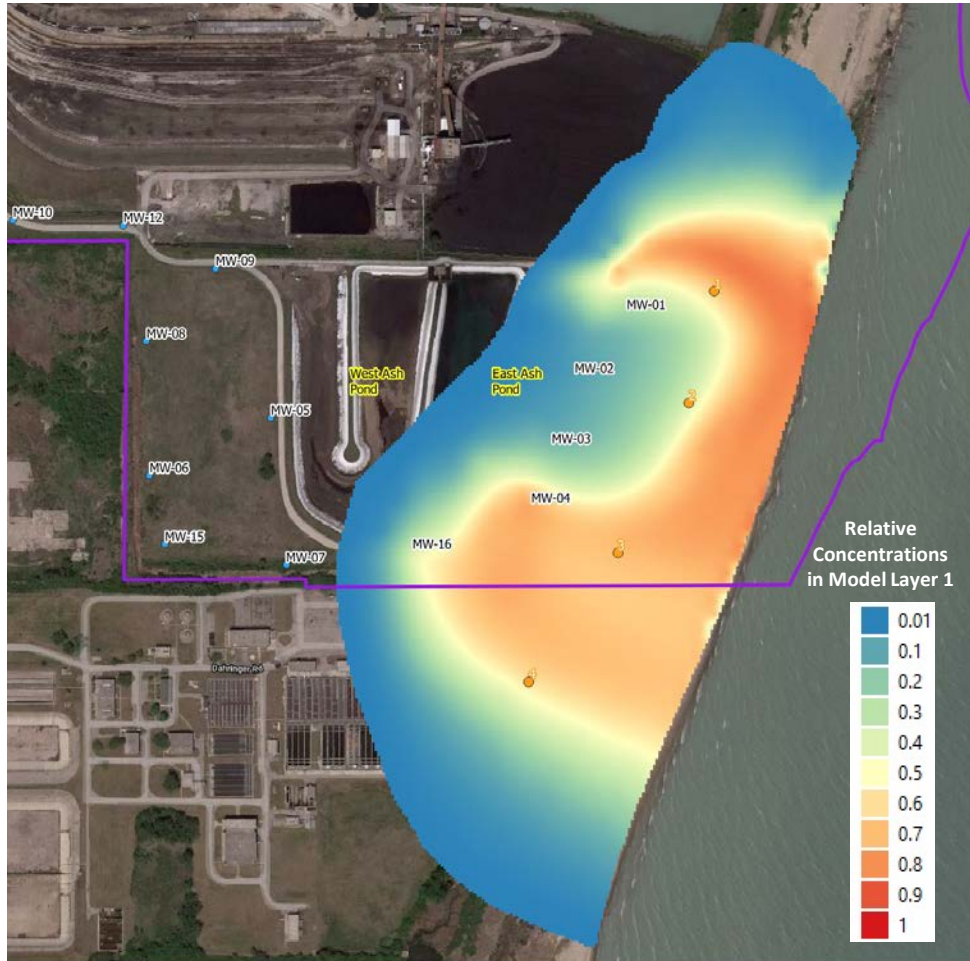


- Model Scenarios:
 - Initial conditions: the calibrated, steady-state flow system and the 100-year equilibrated mass from the constant source model run:
 4. Closure by removal for the west pond with a liner, closure by capping for the east pond: remove the source from beneath the west pond, assume a liner on the west pond with a vertical permeability of 10^{-13} cm/s, assign low (5 OM < background) recharge through west pond footprint. Hydraulically isolate (dewater ash) the source in the east pond from the water table, cover ash with cap system. Assign low recharge through east pond to represent a cap. Assume cap has vertical permeability of 10^{-13} cm/s, assign low (5 OM < background) recharge through east pond footprint. Run for 100 years.

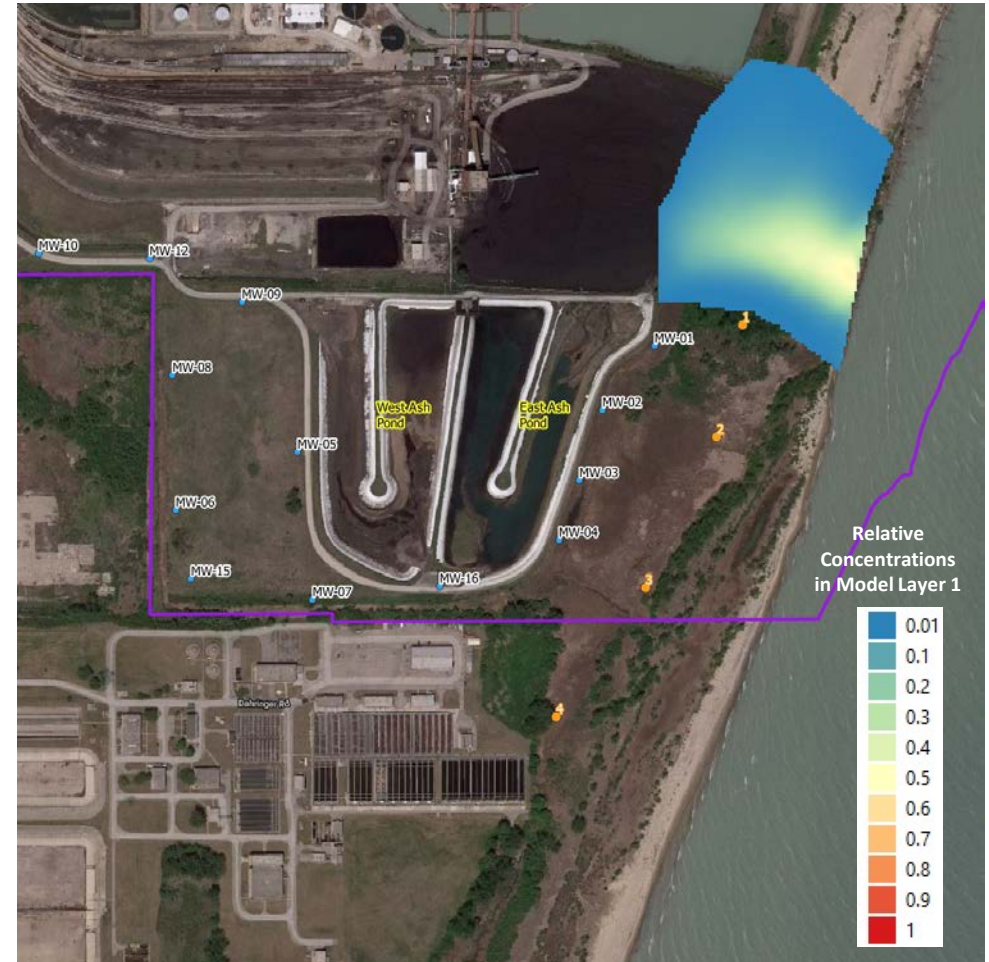
5- and 25-year plume distributions

DRAFT

5 YEAR, Model Layer 1, Scenario 4



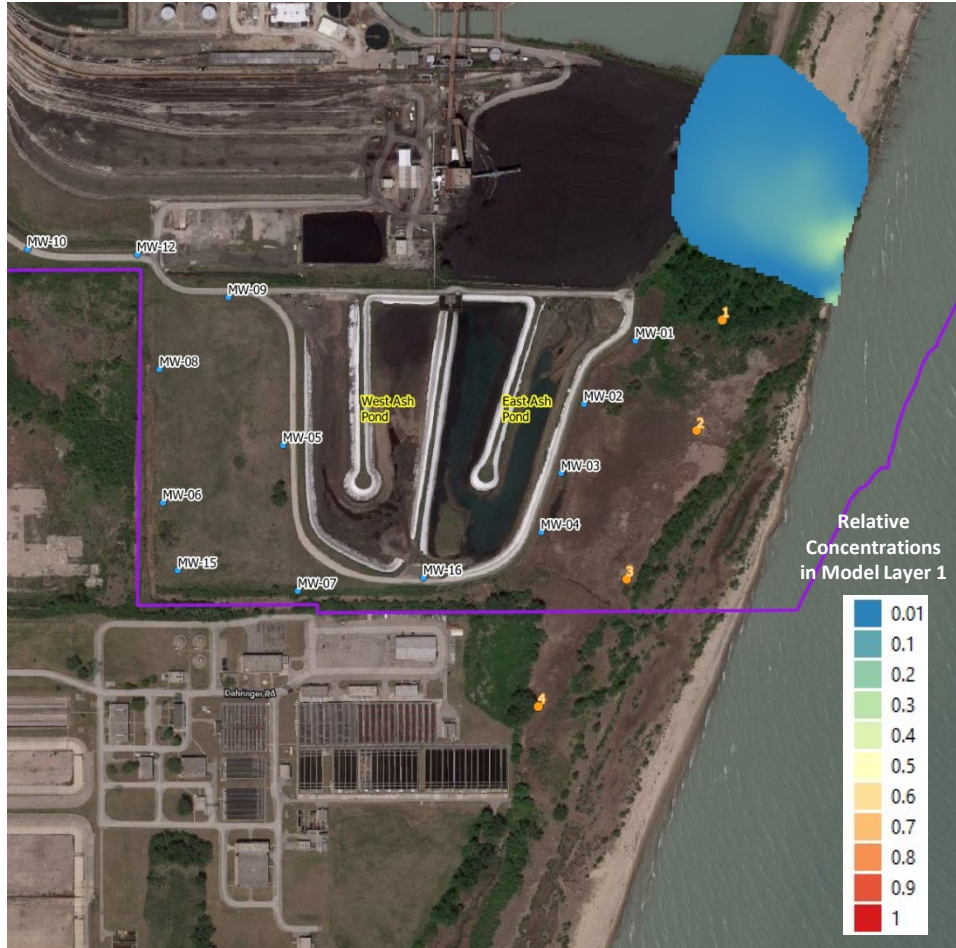
25 YEAR, Model Layer 1, Scenario 4



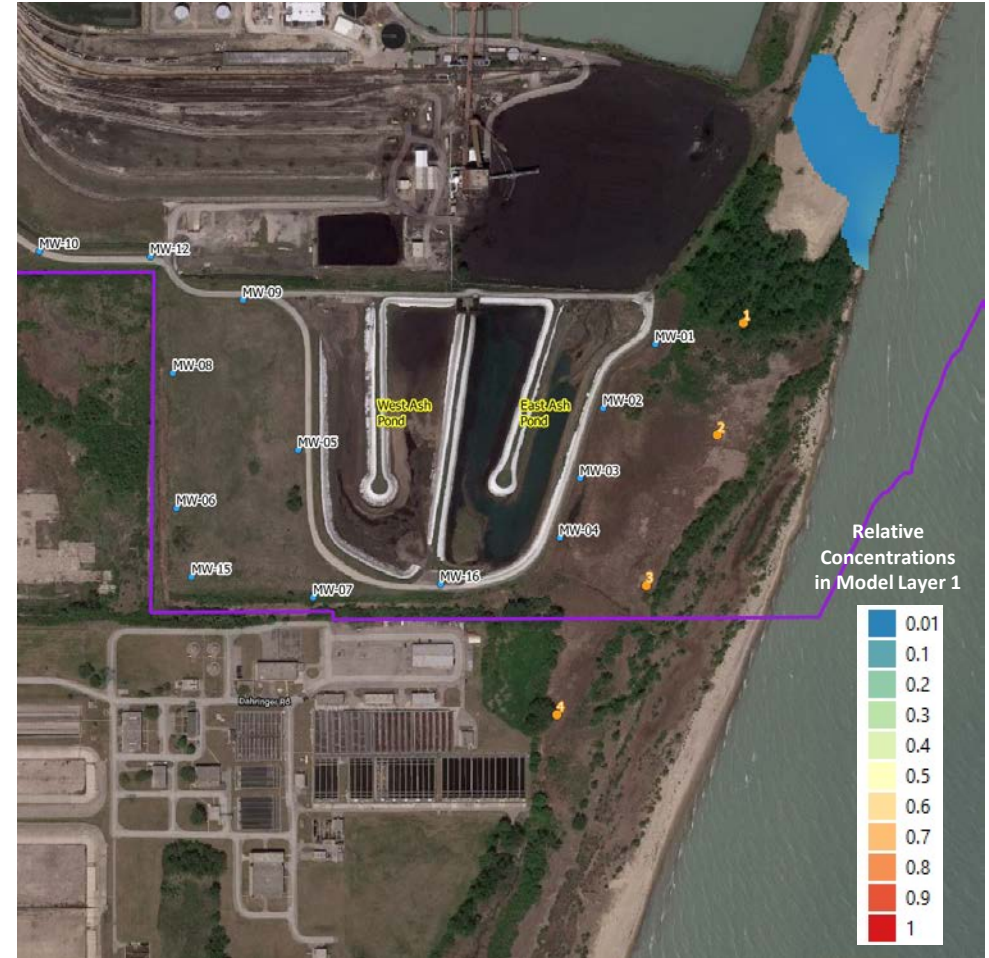
50- and 100-year plume distributions

DRAFT

50 YEAR, Model Layer 1, Scenario 4



100 YEAR, Model Layer 1, Scenario 4



Model Scenario #4

DRAFT

Starting Conditions: Constant source distribution at 100 years

