

# Sparrows Point Phase I Offshore Investigation Report

Summary presented by MDE and  
EPA Region III, April 2016

# Sparrows Point Environmental Trust

- Established in 2014
- To investigate offshore areas for waste/chemicals released from the now demolished steel facility
- Excludes Coke Point offshore area
- The Trust contracted EA Engineering, Science and Technology

# Phase I Offshore Investigation Area – Bear Creek



# Offshore Investigation Process

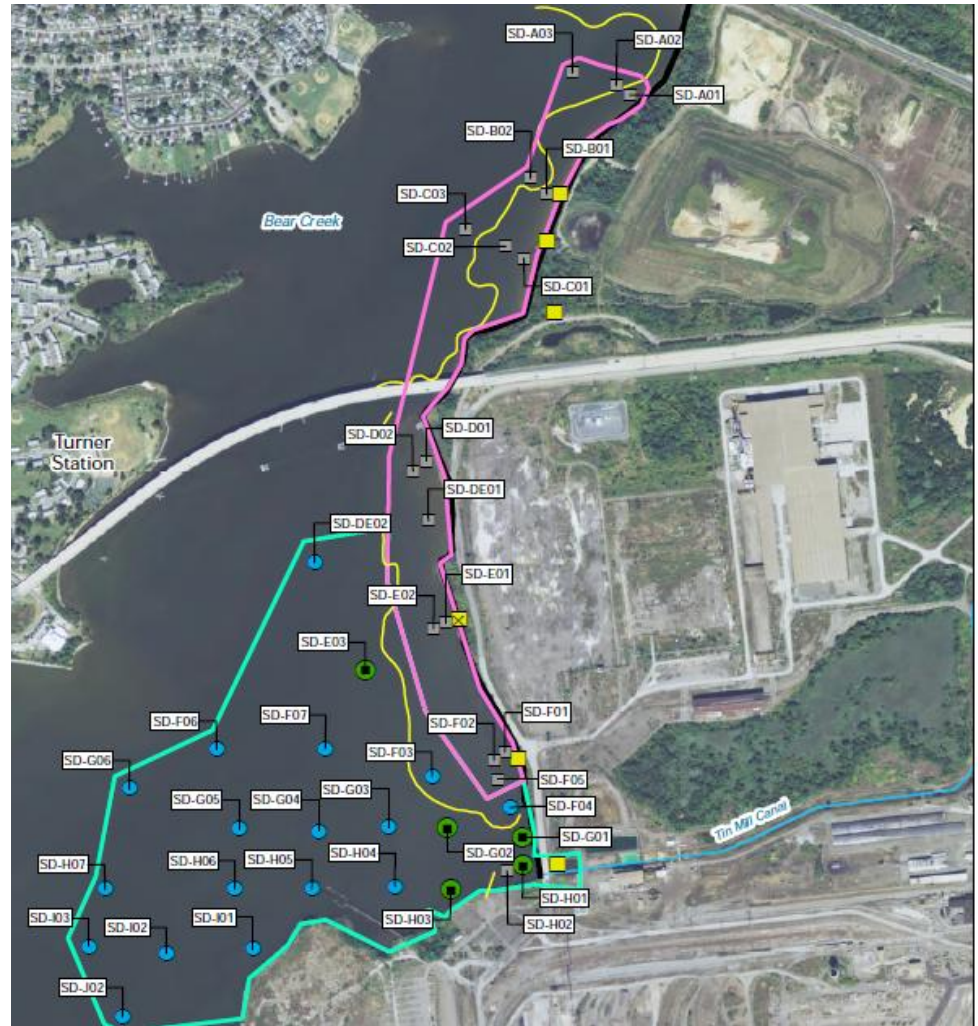
- Collected Bear Creek surface sediment and pore water samples, and Site stormwater samples
- Samples analyzed for Site-related chemicals found in groundwater or all potential stormwater chemicals
- Collected follow-up sediment cores
- Results evaluated in human health and ecological risk assessments

# All Sampling Locations

Two Data Groups:

**Northeast/Near Shore (NNS)** – coarse sediment, little contamination

**Southwest/Tin Mill Canal (SWTM)** – silty, contaminated sediment



# Results

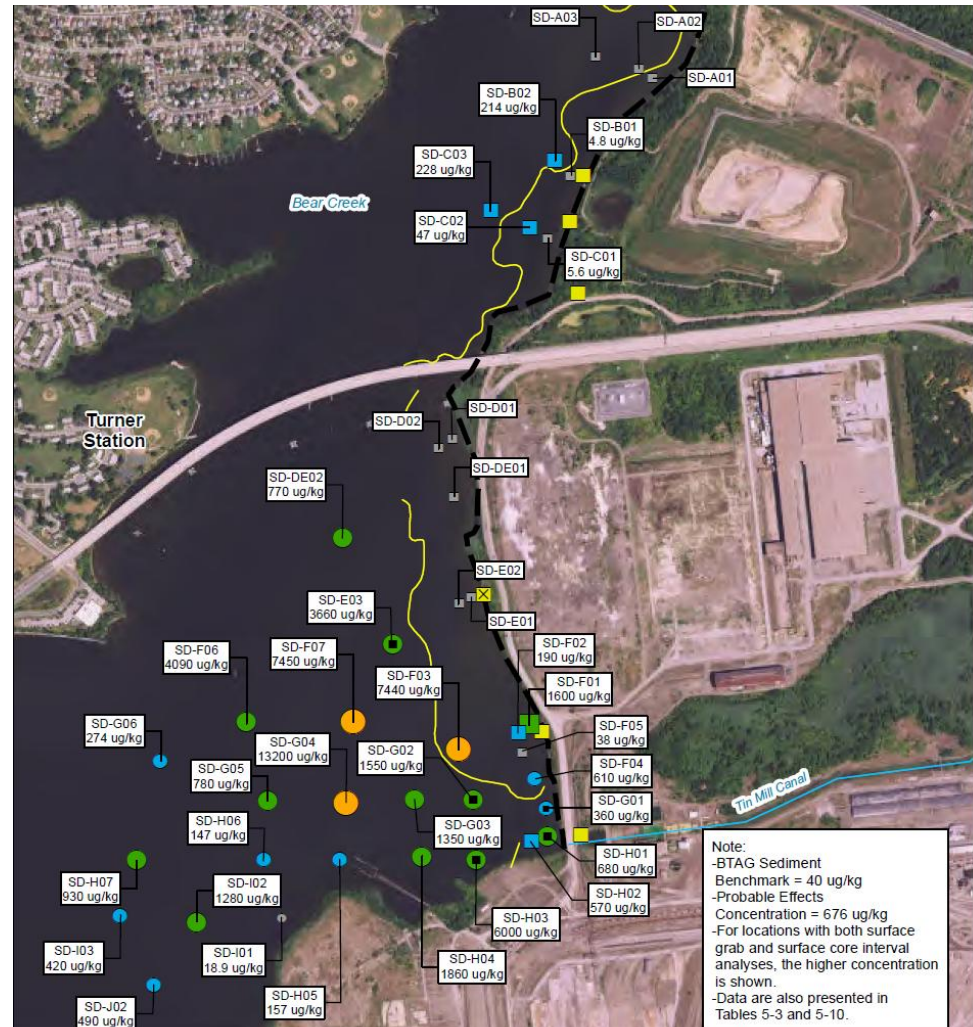
- Metals, polycyclic aromatic hydrocarbons (PAHs), polychlorinated biphenyls (PCBs), and bis(2-ethylhexyl)phthalate were detected in both NNS and SWTM surface sediment
- SWTM silty sediments had greater concentrations of all chemicals plus high oil and grease near Tin Mill Canal outfall
- SWTM sediment core samples similar to surface samples

# Results

- Pore water samples contained primarily elevated cyanide
- Site stormwater samples contained no elevated chemicals except cyanide

# Example: PCB Sediment Distribution

PCBs, select metals, and oil and grease in sediment appear linked to the Tin Mill Canal outfall



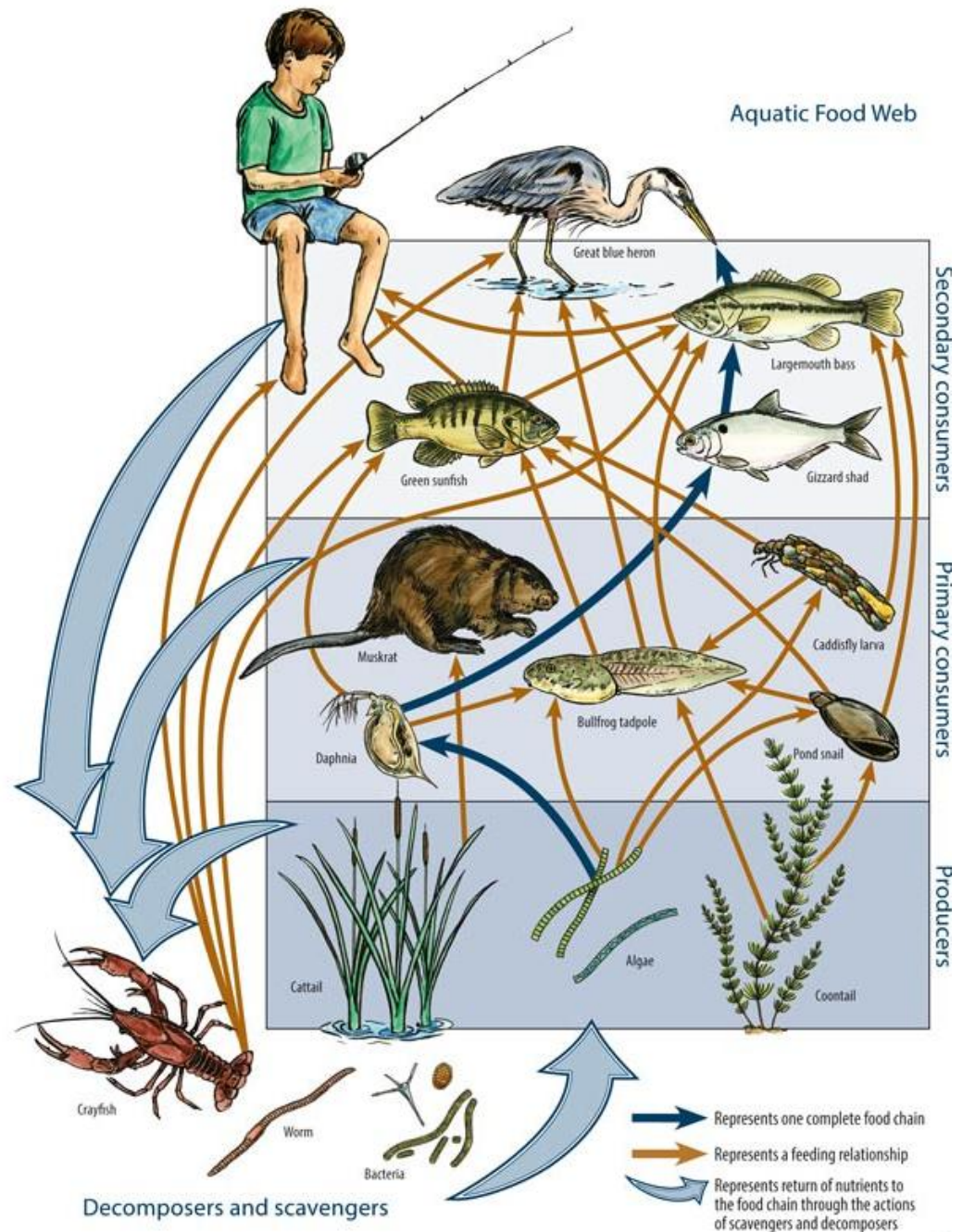


# Data Used for the Risk Assessments

- Bear Creek surface sediment data collected in investigation
- Surface water modeled from the stormwater data collected in investigation
- Chemical analysis results for fish and crab caught from offshore Coke Point and Sollers Point (EA, 2011)
- Estimates of fish and crab chemical concentrations from the investigation's sediment and surface water data

# Offshore Ecological Risk Assessment

- Aquatic (fish) and benthic (worms, mollusks) organisms
- Wildlife foraging on aquatic and benthic organisms



# Offshore Ecological Risk Assessment Process

- Surface sediment and modeled surface water chemical concentrations compared to criteria to protect aquatic and benthic organisms
- Exposure to wildlife (raccoon and great blue heron) foraging on aquatic/benthic organisms estimated by food chain modeling from sediment/surface water chemicals

# NNS Ecological Risk Assessment Results

- NNS assessment evaluated sediment/surface water chemicals identified in current groundwater and stormwater
- Sediment chromium and zinc, and cyanide in storm event surface water may pose risk to aquatic/benthic organisms
- No excess risk identified for wildlife via food chain modeling



# SWTM Ecological Risk Assessment Results

- SWTM assessment evaluated all chemicals analyzed, based on the Tin Mill Canal source
- Sediment metals (cadmium, chromium, copper, lead, nickel, silver, zinc), PAHs, PCBs, bis(2-ethylhexyl)phthalate, oil and grease, and cyanide in storm event surface water likely pose risk to aquatic/benthic organisms
- Food chain modeling identified excess risk to wildlife due to PCBs and selenium



# Human Health Risk Assessment Process

- Evaluated potential recreational users and commercial fishermen for the Phase I offshore area
- Recreating adults, adolescents, and children were assumed to swim 4 days/year and consume 32 fish/crab meals/year (2 days fishing/week in season)
- This consumption rate exceeds MDE fish consumption advisories for Baltimore Harbor
- Fishermen were assumed to work 39 days/year in offshore area, consuming 39 fish/crab meals/year

# Human Health Risk Assessment Process

- Calculations combine exposure assumptions and investigation data to estimate chemical intake
- Chemical intake of recreators/fishermen is compared to toxicity criteria to estimate risk and hazard
- EPA's acceptable excess cancer risk range is  $1 \times 10^{-6}$  to  $1 \times 10^{-4}$
- MDE's acceptable excess cancer risk range is  $1 \times 10^{-6}$  to  $1 \times 10^{-5}$

# Human Health Risk Assessment Results

- NNS assessment evaluated sediment/surface water chemicals identified in current groundwater and stormwater
- No unacceptable risk was identified for the swimming and field-collected fish/crab consumption assumptions
- Modeled fish/crab over-predicted chemical concentrations, exceeding MDE's acceptable cancer risk range for consumption





# Human Health Risk Assessment Results

- SWTM assessment evaluated all chemicals analyzed, based on the Tin Mill Canal source
- Swimming and field-collected fish/crab consumption assumptions resulted in no unacceptable risk using EPA's cancer risk range, but exceeded MDE's more conservative risk range for consumption



# Human Health Risk Assessment Results

- The SWTM consumption assumptions exceeded MDE's fish consumption advisories for Baltimore Harbor
- SWTM modeled fish/crab greatly over-predicted chemical concentrations, exceeding EPA and MDE's acceptable cancer risk range and hazard



# In Conclusion

- Potential ecological risk was found in the SWTM area due to sediment contaminants
- The investigation results will be evaluated in an Engineering Evaluation/Cost Analysis managed by Greg Ham, On-Scene Coordinator, Hazardous Site Cleanup Division EPA Region III