



# Pearce Creek DMCF Exterior Monitoring Post-Placement Sampling Spring 2019 Results

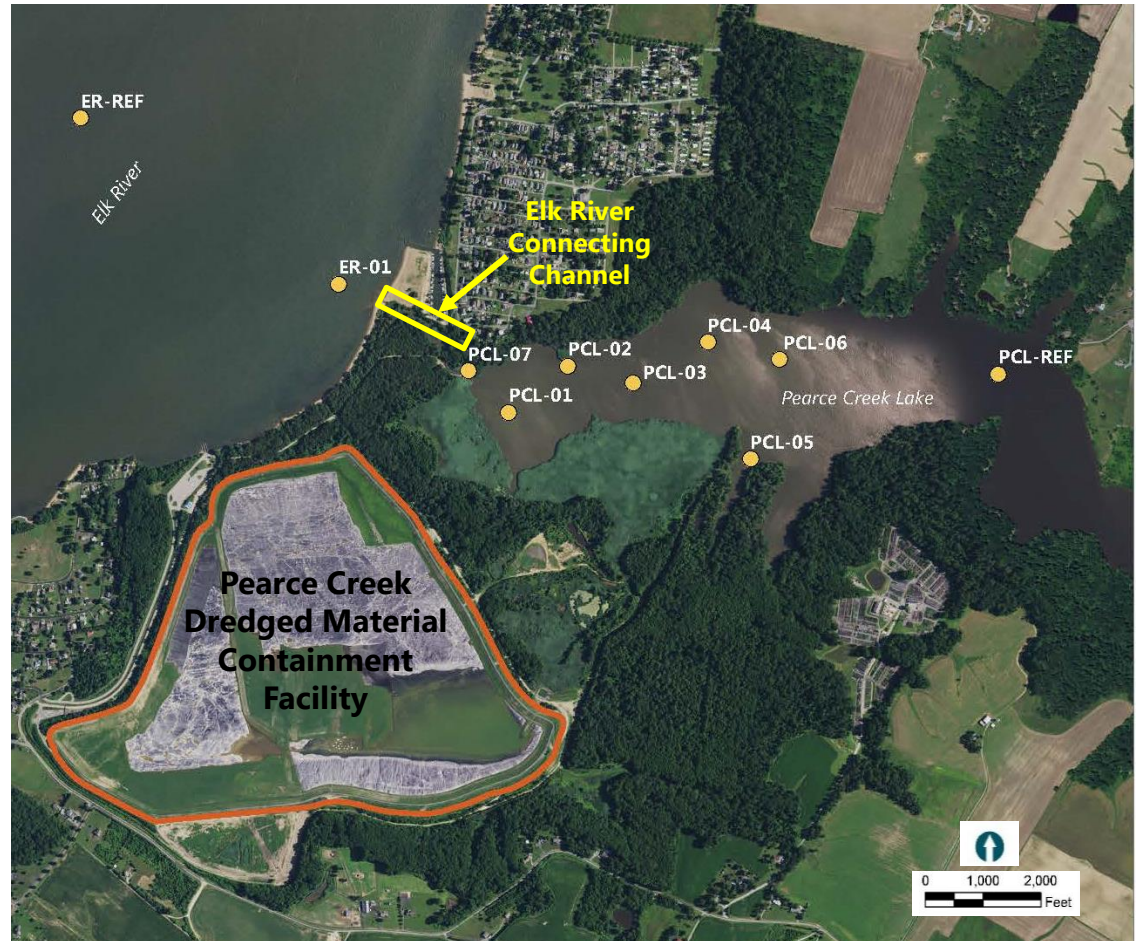
Pearce Creek Implementation Committee  
November 15, 2019

# Project Overview

- Objective: Collect post-placement data from locations to monitor environmental conditions after dredged material placement
- Baseline sampling events were conducted in Fall 2015, Spring and Fall 2016, and Spring 2017
- Dredged material placement has occurred over the last two dredging cycles
- Post-placement monitoring samples for spring collected May 20-22, 2019
- Post-placement testing was consistent with the baseline monitoring program:
  - Surface water quality
  - Sediment chemistry – testing of target chemicals
  - Sediment bioassays – 10-day tests that evaluate organism survival
  - Benthic community – Identification of bottom-dwelling organisms, including number of species (diversity) and number of organisms (abundance)

# Sampling Overview – Spring 2019

- 10 Sampling Locations:
  - 7 Pearce Creek Lake monitoring locations
  - 1 Pearce Creek Lake reference site
  - 1 Elk River monitoring location
  - 1 Elk River reference site
- Reference sites represent areas that are outside of the influence of the DMCF



# Surface Water Results

- Post-placement data comparable between the reference and the monitoring locations
- Post-placement data were also within the range of baseline concentrations
- Turbidity: highly variable at Pearce Creek Lake locations because of natural factors (i.e., bank erosion, algae, or stormwater runoff)
- Chemical Testing - Metals
  - Low concentrations overall; consistent with results from previous sampling events
  - Within the range of concentrations observed during baseline monitoring events
  - None of the metals had concentrations that exceeded the water quality criteria



**Location PCL-05**



**Location PCL-07**

# Sediment Results

- Post-placement data comparable between the reference and the monitoring locations
- Post-placement data were also generally within the range of baseline concentrations
- Sediment Type
  - Pearce Creek Lake monitoring locations comprised of silts and clays
  - Pearce Creek Lake reference location comprised of silts and clays
  - Elk River monitoring location was sandy with shell material
  - Elk River reference location was comprised of silty clays, with a lot of shell material
- Nutrients: Concentrations naturally variable at all locations



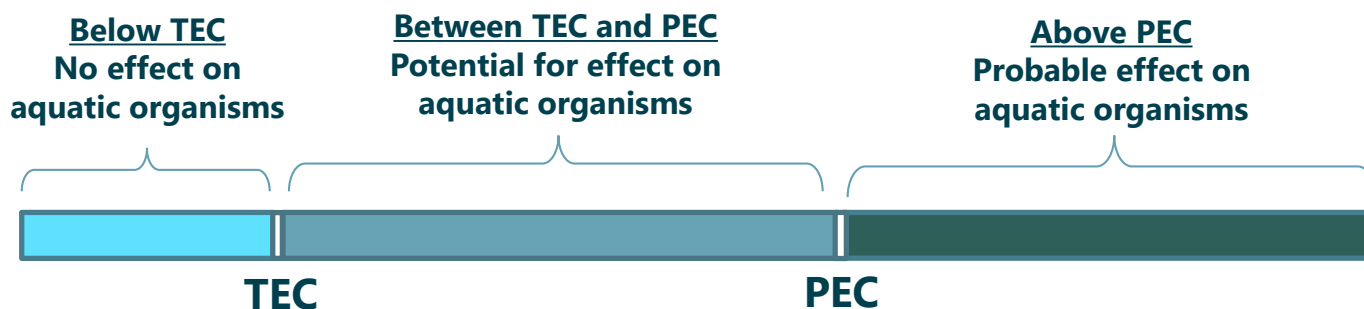
**Elk River Connecting Channel – Elk River Outlet at High Tide**



**Elk River Connecting Channel – Elk River Outlet at Low Tide**

# Sediment Data Analysis - Metals

- Results of chemical testing were compared to freshwater sediment guidelines
  - Derived by scientific community based on actual sediment concentrations
  - Each chemical has two values:
    - A threshold effect concentration (TEC)
    - A probable effect concentration (PEC)



- An “effect” means that an organism’s behavior is impacted, such as a slow down of organism growth rate
- “Effects” do not indicate mortality

# Sediment Chemical Screening - Metals

- Results are generally consistent with the baseline data
    - Pearce Creek Lake
      - Monitoring Locations
        - 5 metals between the TEC and PEC
        - Nickel exceeded the PEC
      - Reference Site
        - 3 metals were between the TEC and PEC
        - Nickel exceeded the PEC
    - Elk River
      - Monitoring Location: no metals exceeded the TEC
      - Reference Site: no metals exceeded the TEC
- Nickel concentrations are consistent with sediment in the upper reaches of the Chesapeake Bay
  - Nickel concentrations are consistent with baseline results and represent background levels for this site

# Benthic Bioassay Results

- 10-day whole sediment toxicity testing using *Hyallela azteca*: freshwater amphipod (laboratory cultured)
- Results for each location compared to reference site and to baseline data
- Results are consistent with the baseline data
  - Survival high for the Pearce Creek Lake and Elk River sediments
  - Sediments support benthic organisms





# Benthic Community Results

- Most of the metrics were within the range of the baseline data
- Abundance is highly variable at each location, but consistent with the baseline data (within the range of data observed previously)
- Indicates that while there is localized variability, the overall benthic community condition has not substantially changed compared to baseline monitoring results



# Exterior Monitoring Summary

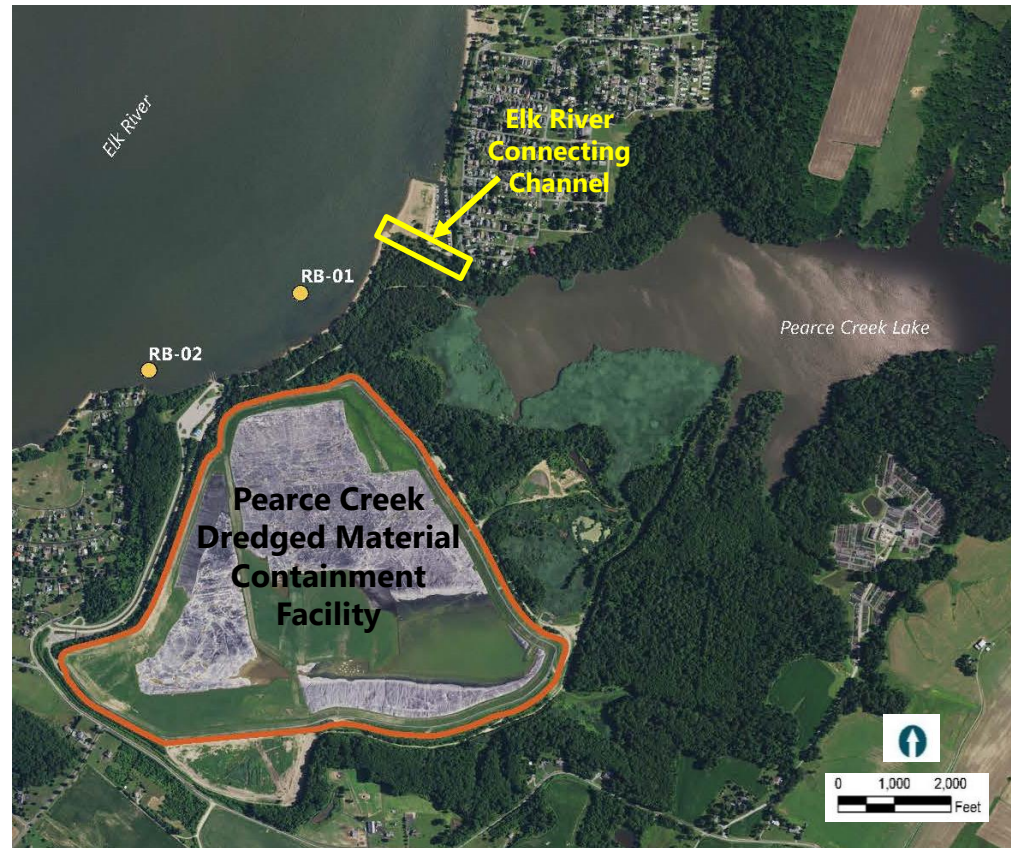
- Third round of post-placement monitoring since the Pearce Creek DMCF was reactivated, followed by two years of dredged material placement
- Baseline data was collected from Fall 2015 through Spring 2017
- Results from all the testing – sediment, surface water, benthic community, and benthic toxicity – is consistent with previous sampling events



# Elk River - Beach Sampling

# Sampling Overview – Spring 2019

- Samples collected in nearshore areas close to beach areas in the Elk River
- Added at the request of citizen members of the PCIC
- Evaluated independently from the exterior monitoring data
- Samples were collected on May 22, 2019
- Included same testing program
  - Sediment
  - Water quality
  - Benthic community
  - Benthic bioassays



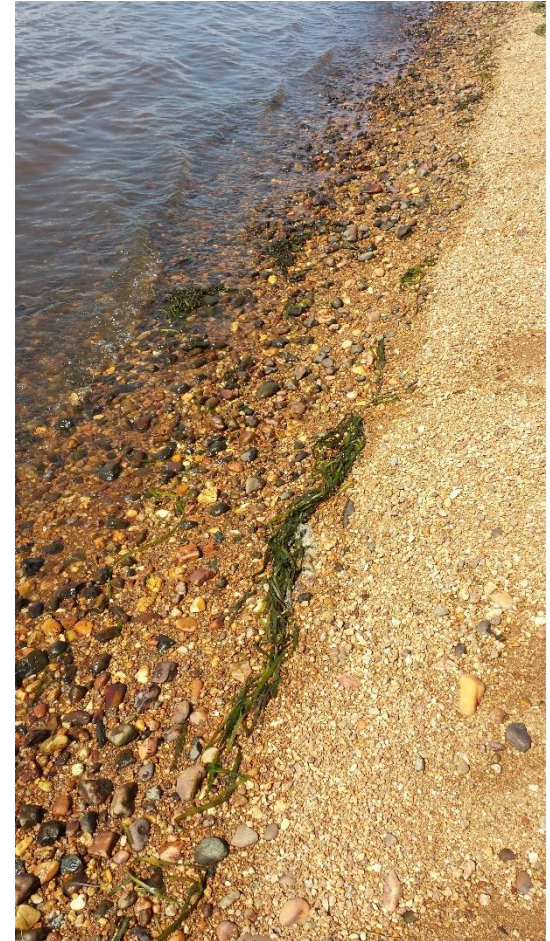
# Surface Water Results

- Locations were classified as freshwater – no measurable salinity
- Turbidity was low (5.1 and 6.4 NTUs)
- Chemical Testing
  - Concentrations are very low; consistent with previous sampling
  - None of the samples had chemical concentrations that exceeded water quality criteria



# Sediment Results

- Sediment Type
  - Location 1 (RB-01) was mostly sand
  - Location 2 (RB-02) was primarily sand with some shell fragments
- Nutrients and Metals
  - Nutrient concentrations naturally variable
  - Metal concentrations generally low and well below the sediment quality criteria
  - None of the metals exceeded TEC values
  - Results consistent with previous sampling events



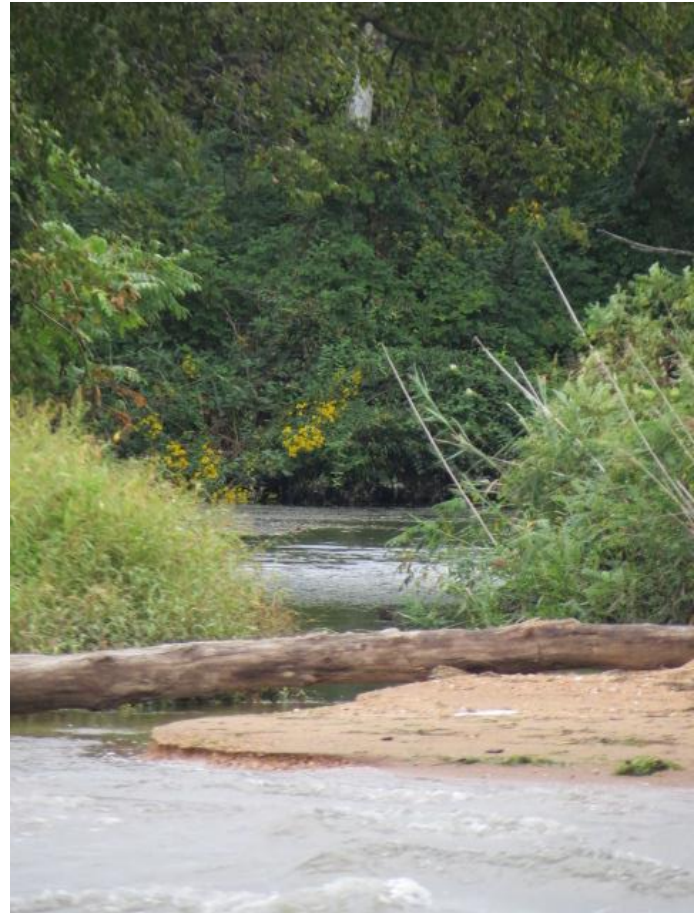
# Benthic Community and Bioassay Results

- Benthic Community
  - Abundance variable, but generally consistent with previous sampling events
- Benthic Bioassays
  - Both samples had high survival, therefore the sediment supports benthic organisms



# Elk River - Beach Sampling Summary

- This was the sixth round of sampling at these locations; third round of dredged material placement since the site was reactivated in 2017
- Results from all the testing – sediment, surface water, benthic community, and benthic toxicity – is consistent with previous sampling events





# Questions/Discussion

