



Pearce Creek DMCF Exterior Monitoring Post-Placement Sampling Fall 2020 Results

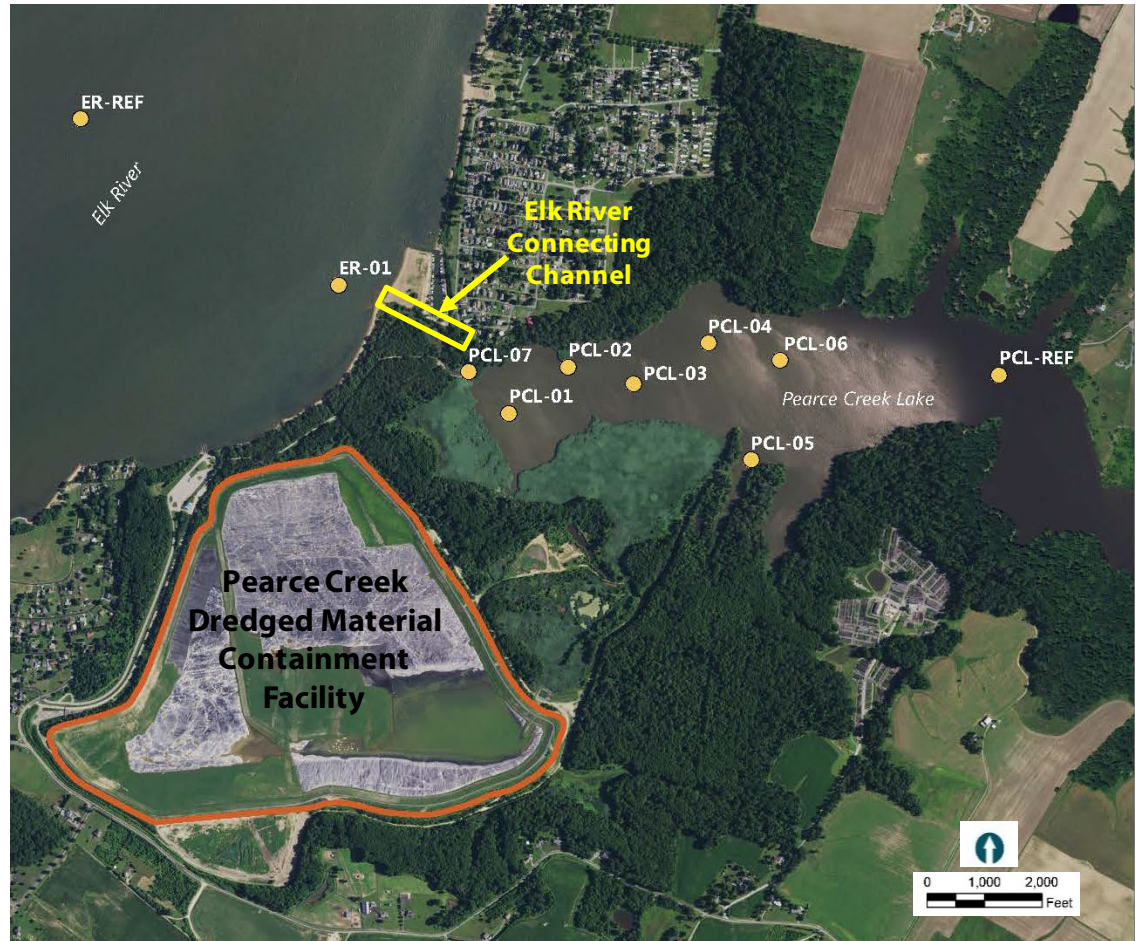
Pearce Creek Implementation Committee
May 2021

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 since the 2017/2018 dredging cycle
- Post-placement monitoring has occurred since Spring 2018; samples for fall 2020 were collected October 5-8, 2020
- 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 – Fall 2020

- 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, except PCL-07 (sands)
 - Pearce Creek Lake reference location comprised of silts and clays
 - Elk River monitoring location was silty clays
 - Elk River reference location was comprised of silty clays, with a lot of shell material
- Nutrients: Concentrations naturally variable at all locations



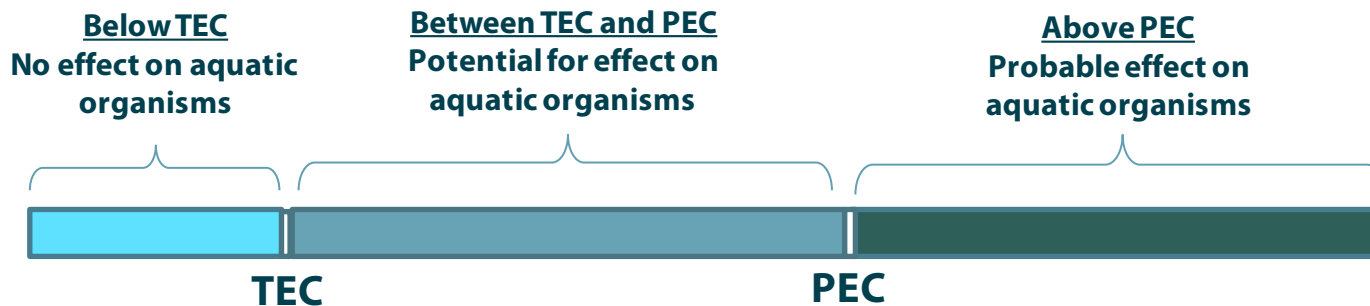
Elk River Connecting Channel – Elk River Outlet at High Tide



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
 - 2 metals were between the TEC and PEC
 - Reference Site
 - 2 metals were between the TEC and PEC

- 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

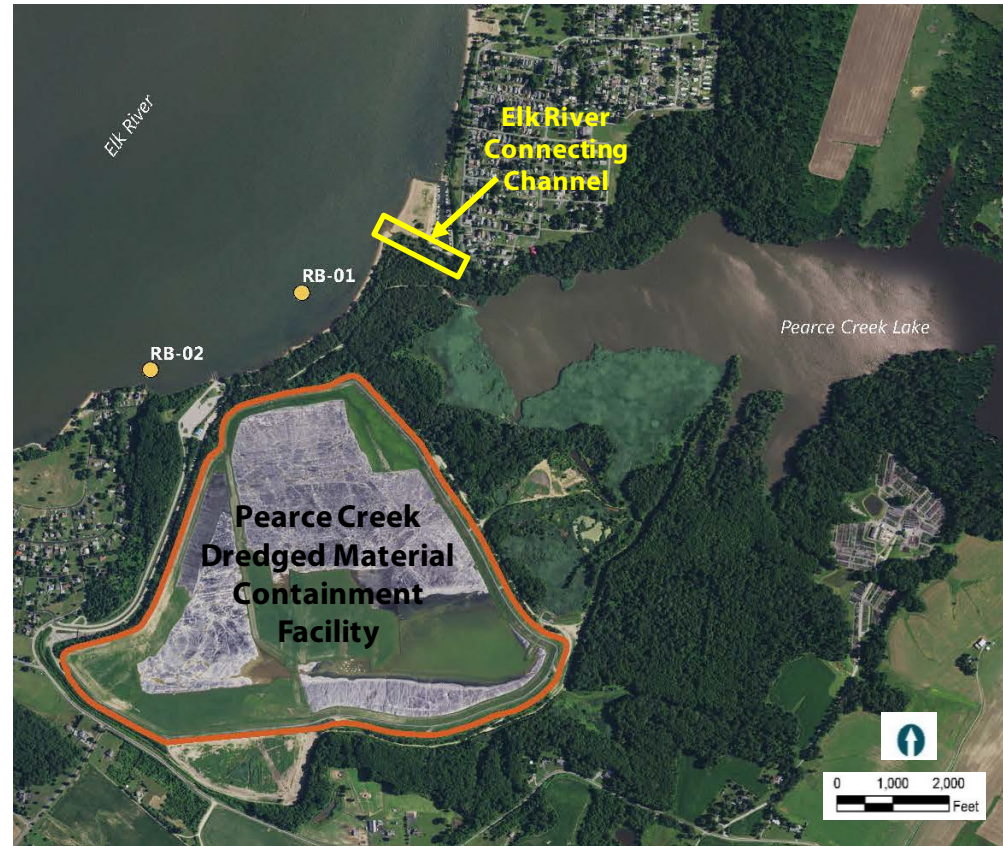
- Fifth round of post-placement monitoring since the Pearce Creek DMCF was reactivated in December 2017, followed by three years of dredged material placement
- Baseline data was collected from Fall 2015 through Spring 2017
- Results from all the testing – sediment, surface water, benthic community,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



Elk River - Beach Sampling

Sampling Overview – Fall 2020

- 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 October 5-6, 2020
- Included same testing program
 - Sediment
 - Water quality
 - Benthic community
 - Benthic bioassays



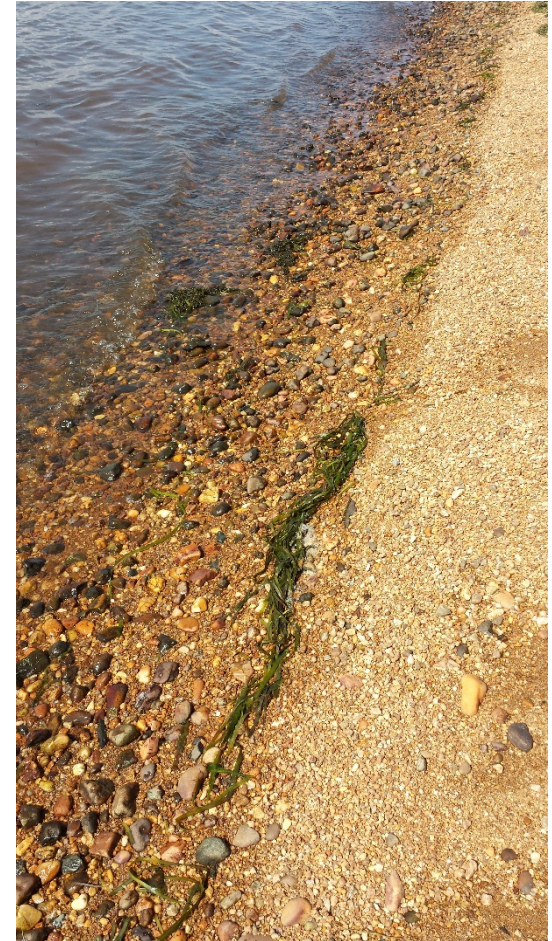
Surface Water Results

- Locations were classified as oligohaline (3.4 and 3.7 ppt)
- Turbidity was low (7.0 and 4.8 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 8th round of sampling at these locations; 3rd 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

