

Jackson River Success Story

About 24 miles of the Jackson River were impaired due to low Virginia Stream Condition Index (VSCI) scores, with 11 of the 24 miles also being impaired for low dissolved oxygen concentrations. The low VSCI scores suggest that the aquatic habitat and community of aquatic organisms that live on the bottom of the river were in a worse condition than is expected for a river like the Jackson River.



Figure 1. The Jackson River

The VSCI score is calculated from the number and types of bottom dwelling invertebrates, called **benthic macroinvertebrates**, which are sampled from the stream bottom. The lower the VSCI score is, the more different and degraded the aquatic community is compared to reference communities. A VSCI score of 60 and above is considered a healthy aquatic community

To address this impairment, the [Jackson River Benthic TMDL study](#) was completed in 2010.

In this study an analysis was done to determine what were the most probable stressors causing these two impairments. It was determined that high nutrient loading, which resulted in high periphyton growth and low dissolved oxygen, was the most probable stressor. Of the multiple point sources in this watershed, there was one major industrial point source and two major municipal waste water treatment plants (WWTPs) that were discharging large nutrient loads. Throughout the study, DEQ worked extensively with MeadWestvaco, the major industrial

discharger, and the major municipal WWTPs (City of Covington and Alleghany County) to reduce point source nutrient loads. The TMDL only set load reductions for point sources, which amounted to an 89% reduction in phosphorus and a 20% reduction in nitrogen. In the case of inorganic phosphorus, MeadWestvaco was able to reduce loads by 90%, reaching the limit of the technology for removing inorganic phosphorus.

Periphyton is a mixture of organisms, including algae, that are attached to objects such as rocks on the riverbed

While these reductions were crucial for restoring the aquatic habitat and community of organisms, summertime low flow conditions due to the upstream Gathright Dam complicated restoration efforts. Low flow conditions allowed for low dissolved oxygen concentrations, more time for periphyton to assimilate the large nutrient loads, and less scouring of the periphyton since water velocities rarely increased. Therefore, in partnership with the Army Corps of Engineers, the TMDL study concluded that implementation of the TMDL should include pulsing the flow in the main stem of the Jackson River in order to mimic summertime storm



Figure 2. Periphyton on rocks

flow and scour the periphyton off of the river bed. In February 2013, the most recent report, titled [Characterization of Jackson River Base Flow and Pulse Flow Water Quality: 2011 and 2012](#) was released, outlining the most recent findings of the TMDL implementation. Of the many results outlined in that report, it was concluded that dissolved oxygen levels were improved and periphyton levels were reduced following pulse events.

Due to the efforts of the point source dischargers, the Army Corps of Engineers, and DEQ, about 10 of the 24 impaired miles of the Jackson River saw a benthic macroinvertebrate community recover as shown by an increase in VSCI scores above the impairment threshold of 60 (**Figure 2**). Additionally, about 20 miles of the James River immediately below this section of the Jackson River also saw a benthic macroinvertebrate community recovery as a result of the efforts of this project.

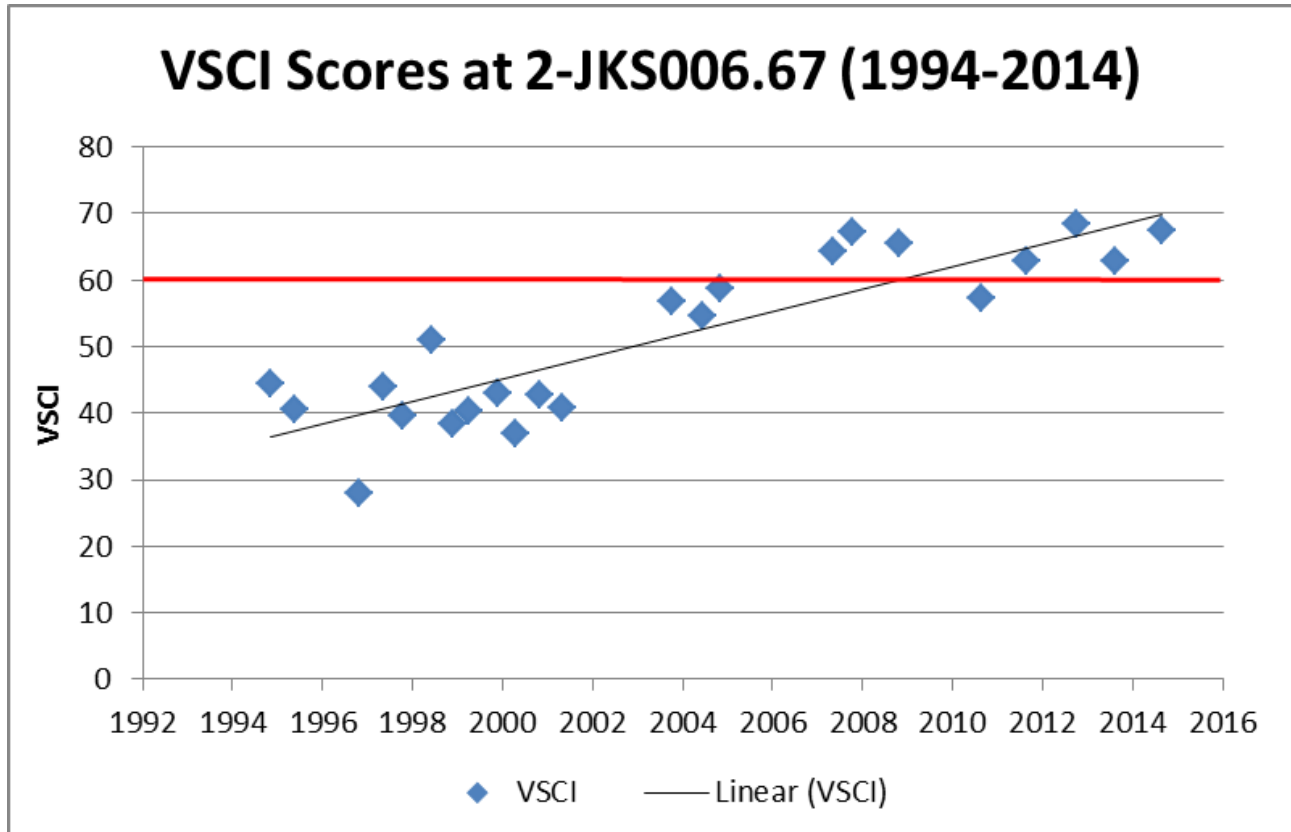


Figure 3. VSCI Scores for a monitoring station located near Dabney Lancaster Community College, 6.67 miles from the mouth of the Jackson River, during 1994-2014.