

Chapter 3.3

Trends in freshwater benthic macroinvertebrate communities in the Maryland Coastal Bays watershed

Ellen Friedman¹

¹Maryland Department of Natural Resources, Monitoring and Non-Tidal Assessment, Annapolis, MD 21401

Abstract

Current conditions of freshwater benthic communities help determine long-term water quality trends. Freshwater benthic communities in the Coastal Bays indicated a strong improvement in water quality from the very poor to lower fair range at the Bishopville Prong and the South Branch stations. Both sites showed an improvement in taxa number, as well as in biotic and diversity indices. There was no significant trend in fair water quality at Birch Branch; Bottle Branch and Trappe Creek stations showed a slight improvement in water quality from the poor to the lower fair range. Both sites showed an increase in taxa number, and Bottle Branch also showed an improvement in biotic index values. Some improvements in water quality were indicated by the benthic community, but conditions remain fairly degraded in the Coastal Bays watershed.

Introduction

Freshwater benthic macroinvertebrate data were collected annually since 1978 as part of Maryland's core water quality monitoring program (Friedman 1996). Core site trend data were collected and analyzed at each specific site as a measure of water quality at that site. This contrasts with MBSS data (Chapter 3.2), which utilized multiple parameters to assess the health of the entire stream. Data were collected at two non-tidal stations (Birch Branch, South Branch) and three tidal freshwater stations (Bottle Branch, Bishopville Prong, Trappe Creek) to determine long-term water quality trends. Three of these stations were tributaries to the St. Martin River. They were on Birch Branch (BIH0009), Bishopville Prong (BSH0030), and South Branch (SBR0022; also known as Church Branch) (Figure 3.3.1). One of the stations was on the headwaters of Trappe Creek (TRC0059) and the other was on a tributary to Trappe Creek named Bottle Branch (BOB0001) (Figure 3.3.1).

Management Objective: Improving trends for stream health

Indicator 1: Community trend analysis (see below)

Analyses

Four benthic macroinvertebrate community measures were calculated: taxa number, Shannon-Weiner Diversity index, Modified Hilsenhoff biotic index, and percent *Ephemeroptera*, *Plecoptera*, *Trichoptera* (%EPT) and analyzed using non-parametric statistics (Friedman 1996).

Results

St. Martin River – Benthic macroinvertebrate community indicated a strong improvement in water quality from the very poor to lower fair range at the Bishopville Prong (BSH0030) and the South Branch (SBR0022) stations (Figure 3.3.2). Both sites showed an improvement in taxa number and biotic and diversity indices). The benthic community indicated no significant trend in fair water quality at Birch Branch (BIH0009) (Figure 3.3.2).

Newport Bay – Benthic macroinvertebrate communities at both Bottle Branch (BOB0001) and Trappe Creek (TRC0059) stations showed a slight improvement in water quality from the poor to the lower fair range. Both sites showed an increase in taxa number (and Bottle Branch also showed an improvement in biotic index values (Figure 3.3.3).

References

Friedman, E. 1996. Status and trends in benthic macroinvertebrate communities as an indicator of water quality at Maryland's core monitoring stations, 1976-1992. CBWP-MANTA-MD-96-1. Maryland Department of Natural Resources, Annapolis, MD.

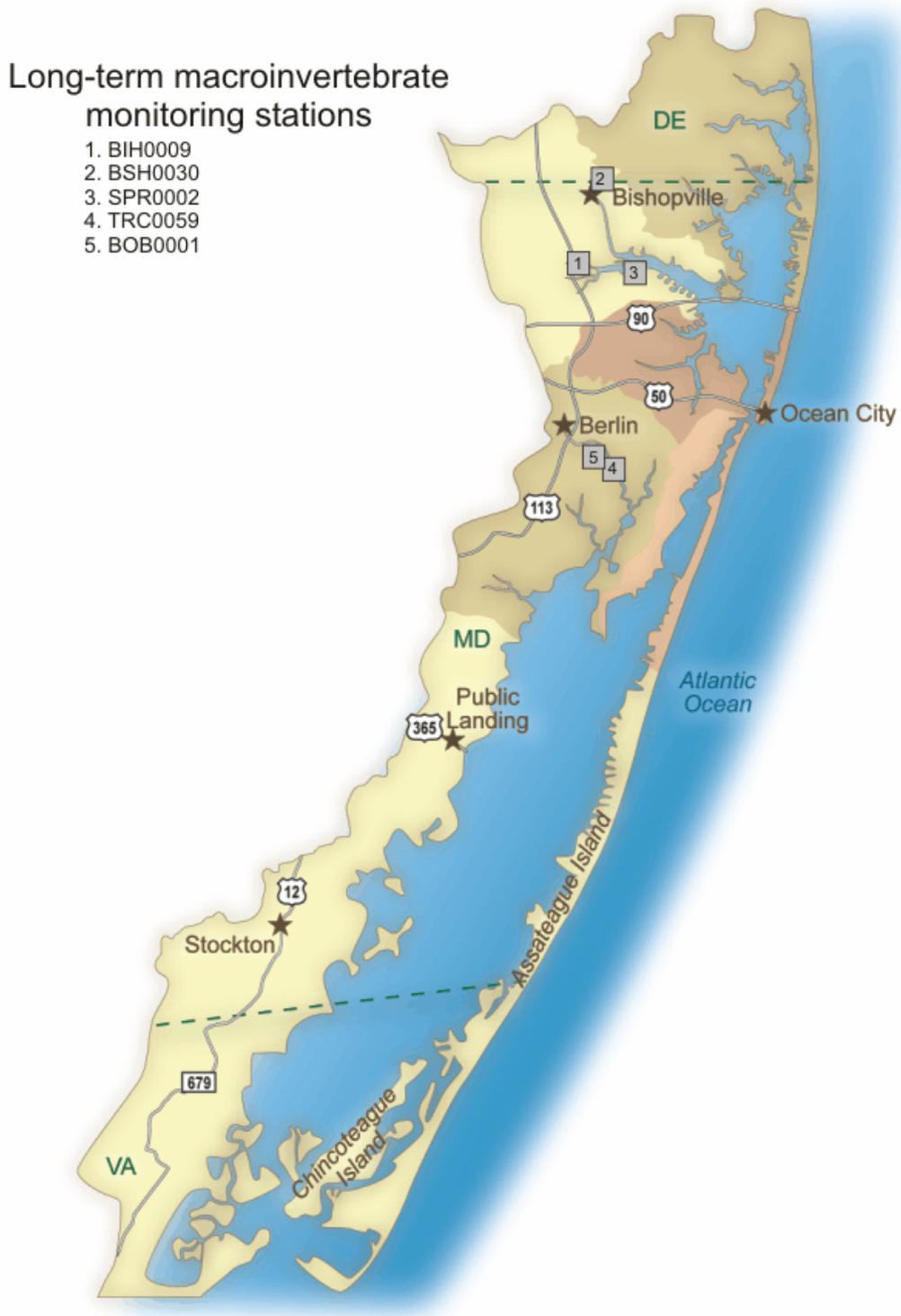


Figure 3.3.1: Locations of long-term macroinvertebrate monitoring stations in the Coastal Bays.

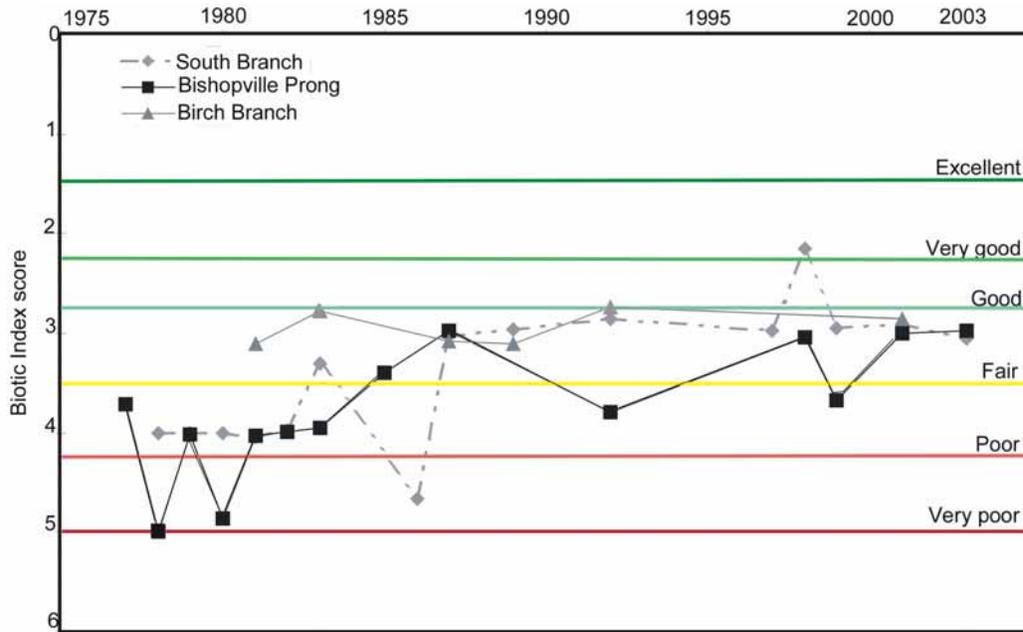


Figure 3.3.2: Trends in freshwater macroinvertebrate community over time in three tributaries of the St. Martin River. Cut-off points and ranking categories were developed through an amalgamation of four commonly used diversity indices (see text). The biotic index score shown here is the modified Hilsenhoff biotic index. Birch Branch and South Branch are both non-tidal stations.

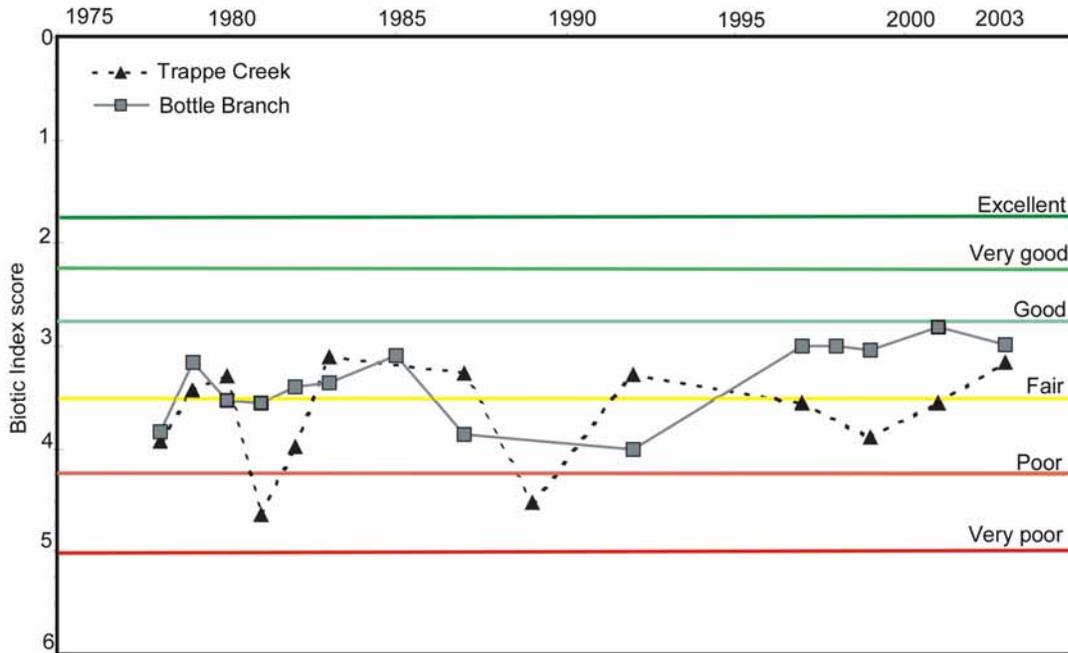


Figure 3.3.3: Trends in freshwater macroinvertebrate community over time in two tributaries of Newport Bay. Cut-off points and ranking categories were developed through an amalgamation of four commonly used diversity indices (see text). The biotic index score shown here is the modified Hilsenhoff biotic index.