

Chapter 7.4

Summary of benthic community index results for the Maryland Coastal Bays

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Abstract

Benthic communities play an important role as food for fish and in cycling nutrients between the sediment and the water column. Benthic organisms were sampled and identified in the laboratory. The Mid-Atlantic Integrated Assessment (MAIA) benthic index was then calculated based on the abundance of species as well as the occurrence of certain tolerant or intolerant species. Open bays met the MAIA benthic index goal, while tributaries were degraded to severely degraded. Severely degraded sites either had few organisms and dominance of one species or had an unbalanced community heavily dominated by a small number of species, usually annelids. In general, the results of the 2010 benthic monitoring in the Maryland Coastal Bays were very similar to the results of previous years (2005 and 2006), suggesting unchanging benthic community conditions in Maryland's estuaries.

Introduction

Benthic communities play an important role as food for fish and in cycling nutrients between the sediment and the water column. The benthos is a good indicator of system health because they integrate conditions over time. Data used in this report focuses on data collected during the National Coastal Assessment (NCA) surveys 2000 and 2003.

Monitoring of benthic communities is currently not a long-term part of the monitoring program. Benthic monitoring data has been collected as part of U.S. EPA Environmental Monitoring and Assessment Program (EMAP) and EMAP-style monitoring programs (EMAP, Joint Assessment, MAIA and NCA).

Management Objective: Maintain healthy benthic communities.

Draft Indicator: MAIA Benthic index > 3

Analyses

Analyses benthic community condition used the MAIA benthic index of biotic integrity which combines measures of abundance, number of taxa, Shannon-Weiner diversity index, percent dominance, percent abundance of pollution indicative taxa, percent abundance as pollution sensitive taxa, percent abundance of deep deposit feeders, percent abundance of Bivalves and the percent abundance ratio of Tanypodinae to Chironomidae (Llanso et al. 2002). Epifaunal organisms were eliminated from the analyses. The mean benthic index of 3.39 (met goal) was calculated by averaging results from 28 fixed stations visited in 2010.

Status of benthic community

Assawoman Bay

All sites met the benthic index goal in Assawoman Bay except the Greys Creek site (Figure 7.4.1). The Greys Creek site was degraded due to low diversity.

St. Martin River

The site in the lower mainstem of the river (XDN3724) met benthic index goal while sites in the prongs (SPR0009 and XDN4797) were either degraded or severely degraded (Figure 7.4.1). Site XDN3724 scored high for abundance and moderate for diversity and bivalves. The sites in the prongs scored low in every category. SPR0009 has been severely degraded in previous years, whereas the benthic condition of XDN4797 has varied depending on precipitation and river flow (Figure 7.4.1).

Site NCCA10-1614 in the St. Martin River was resampled one month after the initial visit. This site met the goal during the first visit, but was classified as degraded during the second visit. In both visits NCCA10-1614 exhibited large numbers of organisms above the upper abundance threshold possibly indicative of eutrophic conditions. The community was numerically dominated by small polychaete annelids (*Streblospio benedicti* and *Mediomastus ambiseta*) but the number of species was high. During the second visit no bivalves were found, and this caused the bivalve metric to score 1 and the site to fail the index. Because this difference is small, the site has been classified as meeting the goal in Figure 7.4.1.

Isle of Wight

All sites passed except upper Turville and Herring creeks (Figure 7.4.1). Turville Creek has been severely degraded in previous years and scored low for all parameters. While the Herring Creek site was degraded due to low taxa score. Manklin Creek had low diversity and high abundance.

Sinepuxent

The one site in Sinepuxent Bay met the benthic index goal with high scores in all categories (Figure 7.4.1).

Newport

The one site in the bay proper (XCM4878) passed the benthic index goal (Figure 7.4.1). The site in Newport Creek was found to be severely degraded. Newport Creek had mostly large abundance of organisms and were numerically dominated by oligochaetes, possibly indicating enriched organic conditions.

Chincoteague

All sites meet the benthic index goal (Figure 7.4.1). Sites NCCA10-1629, NPS 7 and NPS-10 scored high for bivalves while two sites (XCM0159 and XBM1301) scored low for abundance.

Summary

Open bays met the benthic index goal while tributaries were considered degraded to severely degraded. Sites that were severely degraded either had few organisms and dominance of one species or had an unbalanced community heavily dominated by a few species, usually annelids. Benthic condition in Isle of Wight and Chincoteague bays was good, largely unchanged from the last two previous years of monitoring (2005 and 2006), whereas the benthic condition of XDN4797, mouth of Bishopville Prong, has varied depending on precipitation and river flow.

Monitoring of regions subject to large environmental fluctuations are best monitored over time to assess the long-term response of the community and the relative influence of anthropogenic factors over the natural range of variability (Llanso *et al* 2002). The continuation of benthic monitoring in the Coastal Bays is an important indicator of ecosystem health.

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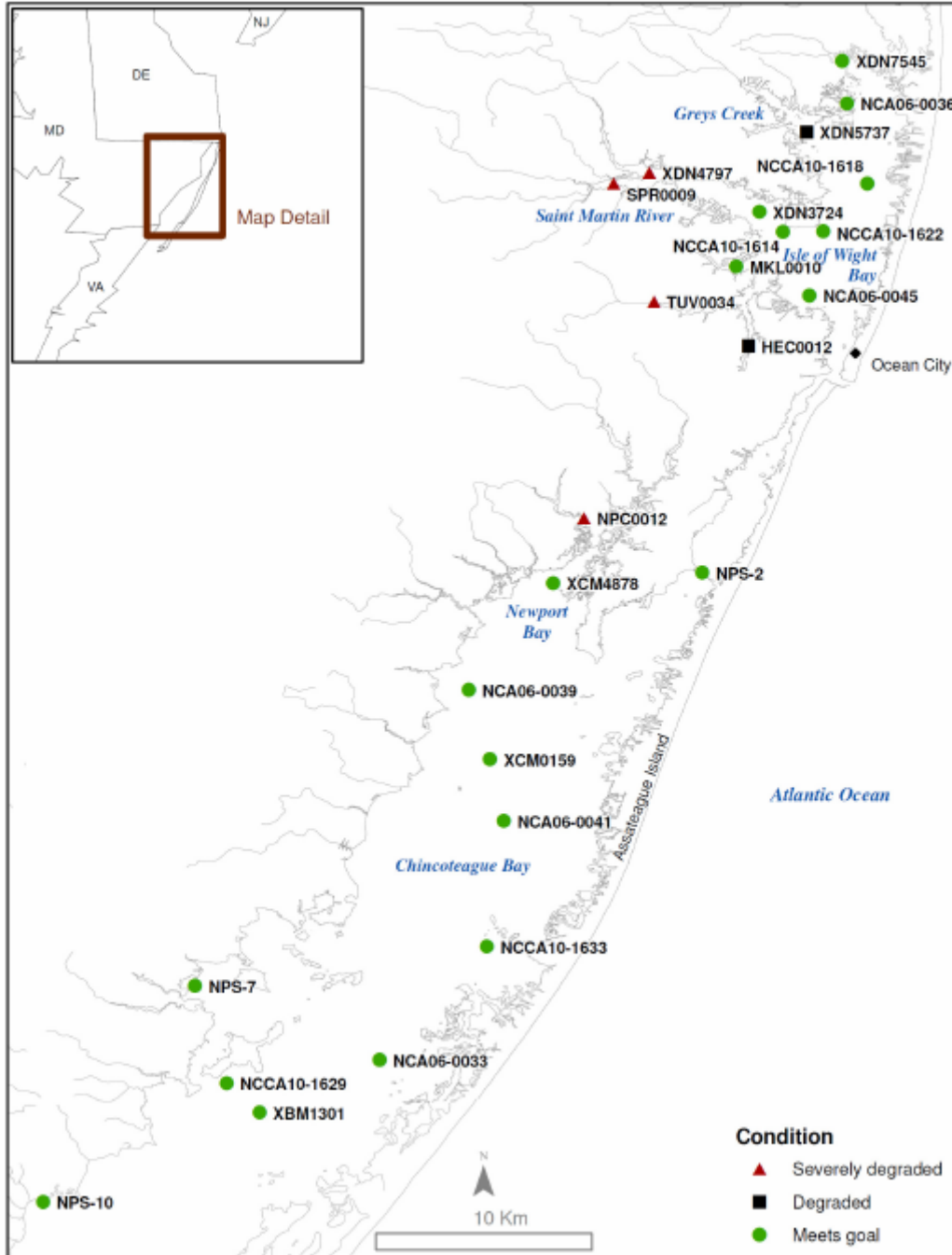


Figure 7.4.1 Benthic index of biotic integrity values calculated based on August 2010 survey for stations throughout the Coastal Bays.