Howard County Biological Monitoring and Assessment Program

Metadata:

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Citation:

Citation_Information:

Originator: Howard County Government-Bureau of Environmental Services
Originator: Angela Morales
Publication_Date: Unknown
Title:
Howard County Biological Monitoring and Assessment Program
Online_Linkage: http://www.co.ho.md.us/DPW/watershed_management.htm

Description:

Abstract:

Stream monitoring was conducted throughout the watershed and involved measuring instream water quality, sampling and assessing the biological community (benthic macroinvertebrates), visually assessing the instream and riparian physical habitat, and performing cross sectional and substrate particle size measurement and analysis. Monitoring is conducted at 10 sites within each of the three target PSUs each year. The assessment methods followed the current MBSS protocols (DNR, 2007) and the SOPs described in the County's QAPP (DPW, 2001). All data collection occurred between March 12 and March 30, 2009, within the Spring Index Period as required by the MBSS sampling protocols. Monitoring sites were marked in the field using tree tags (when possible) at the midpoint of the reach. The position of each site was collected using a GPS unit accurate to within 2 meters. All field data were entered into the Ecological Data Application System (EDAS) Version 3.0 (Tetra Tech, 1999). Photographs were taken to document conditions at the time of data collection.

The sampling design employed a randomized census approach stratified by stream order, with a total of 30 sites distributed among the three PSUs. Ten sites were located in each subwatershed. To select primary and alternate sampling sites, stream lengths were summed by stream order within each subwatershed. The length of stream by stream order and its percentage of the total length within the subwatershed determined the number of sites selected on that order stream. The randomized approach was then applied within each subwatershed. The National Hydrography Dataset (NHD) stream layer was divided into 1-meter reaches and each reach was

assigned a number. A random number generator was used to select sampling reaches for 2009. Both primary and alternate sites were selected in case the primary site was ephemeral (dry), inaccessible, or unsafe to sample.

To supplement the macroinvertebrate sampling and habitat assessment, instream water quality measurements were performed. Field water quality measurements were collected in situ at all sites according to methods in the County QAPP. Each parameter was recorded at the bottom, middle and upstream portion of each sampling reach (including field QC sites) and averaged for a final value. Most in situ parameters were measured using a YSI® Professional Plus series multiprobe water quality meter. Turbidity was measured with a Hach® 2100 Turbidimeter. Water quality meters were regularly inspected, maintained, and calibrated to ensure proper usage and accuracy of the readings. Calibration logs were kept by field crew leaders and checked by the project manager regularly.

Biological assessment methods within Howard County are designed to be consistent and comparable with the methods used by Maryland Department of Natural Resources (DNR) in their Maryland Biological Stream Survey (MBSS). The methods have been developed locally and are calibrated to Maryland's physiographic regions and stream types. Because MBSS methods dictate that habitat assessments occur during the Summer Index Period while sampling fish communities, which the County does not complete, physical habitat condition for the Patuxent watershed was assessed using the EPA's Rapid Bioassessment Protocol (RBP) (Barbour et. al, 1999) habitat assessment for high-gradient streams. Certain MBSS habitat parameters, namely percent shading, require full leaf out to accurately assess, which is often misrepresented during the Spring Index Period when leaves typically have not yet opened. However, it should be noted that MBSS physical habitat data is collected to supplement RBP data, and potentially for use in future investigations or comparisons.

Benthic macroinvertebrate collection followed the QAPP which closely mirrors MBSS procedures (DNR, 2007). Benthic macroinvertebrate sampling is conducted during the Spring Index Period (March 1st to May 1st) along a 75-meter reach. The multi-habitat D-frame net approach was used to sample a range of the most productive habitat types within the reach. In this sampling approach, a total of twenty jabs are distributed among all available habitats within the stream system and combined into one composite sample. Sampled habitats include submerged vegetation, overhanging bank vegetation, leaf packs, mats of organic matter, stream bed substrate, submerged materials (i.e., logs, stumps, snags, dead branches, and other debris) and rocks. Benthic macroinvertebrate samples were processed and subsampled according to methods described in the MBSS Laboratory Methods for Benthic Macroinvertebrate Processing and Taxonomy (Boward and Friedman, 2000). Each biological monitoring site is characterized based on physical characteristics and various habitat parameters following the Environmental Protection Agency's Rapid Bioassessment Protocol (RBP) habitat assessment for high gradient streams (Barbour et. al, 1999). For sites occurring within the fall zone that were characteristic of the coastal plain physiographic region, additional low gradient habitat. Cross sections were surveyed at each monitoring station to develop a channel characterization and measurement of cross sectional area and discharge. Each cross section was located on a representative cross-over reach and was surveyed with a laser level and stadia rod. The channel bed and bank materials were characterized at each cross section using pebble count analysis. A single pebble count, modified from the technique developed

by Wolman (1954), was conducted in each reach to determine the composition of channel materials and the median particle size for each site. The pebble count procedure was adapted from Stream Channel Reference Sites: An Illustrated Guide to Field Technique (Harrelson et al, 1994). The pebble count was conducted at 10 transects across the entire assessment reach. Transects were positioned based on the proportion of riffles/pools/runs in the assessment reach as estimated by visual inspection. The count was conducted within the entire bankfull channel. The pebble counts provide roughness values necessary for calculations of velocity and discharge. Additionally, a Rosgen Level II characterization (Rosgen, 1996) was completed for each stream reach based on field-collected data. Table 9 includes general descriptions for each channel type classification based on the Rosgen classification system for natural rivers (Rosgen, 1996).

Purpose:

The Howard County Department of Public Works Stormwater Management Division initiated the Howard County Biological Monitoring and Assessment Program in the spring of 2001. The County initiated the monitoring program to establish a baseline ecological stream condition for all of the County's watersheds. The program involves monitoring the biological health and physical condition of the County's water resources and is designed on a five year rotating basis such that each of the County's 15 watersheds, or primary sampling units (PSU) will be sampled once every five years.

Time_Period_of_Content:

Time_Period_Information:

Range_of_Dates/Times:

Beginning_Date: 20010307

Ending_Date: Present

Currentness_Reference:

ground condition

Status:

Progress: In work

Maintenance_and_Update_Frequency: As needed

Spatial_Domain:

Bounding_Coordinates:

West_Bounding_Coordinate: -77.1831

East_Bounding_Coordinate: -76.7124

North_Bounding_Coordinate: 39.362598

South_Bounding_Coordinate: 39.10661

Keywords:

Theme:

Theme_Keyword_Thesaurus: None

Theme_Keyword: WADEABLE STREAMS

Theme_Keyword: Habitat

Theme_Keyword: Watersheds

Theme_Keyword: Streams

Theme_Keyword: BENTHOS

Theme_Keyword: WATER QUALITY

Place:

Place_Keyword_Thesaurus: None

Place_Keyword: Maryland

Place_Keyword: Howard County

Access_Constraints: None

Use_Constraints:
Use at your own risk
Point_of_Contact:
Contact_Information:
Contact_Person_Primary:
Contact_Person: Angela Morales
Contact_Organization: Howard County Government-Bureau of Environmental Services
Contact_Position: Environmental Planner
Contact_Address:
Address_Type: mailing and physical address
Address:
6751 Columbia Garteway Drive, Suite 514
City: Columbia
State_or_Province: Maryland
Postal_Code: 21046
Country: USA
Contact_Voice_Telephone: (410) 313-6586
Contact_Electronic_Mail_Address: amorales@howardcountymd.gov
Hours_of_Service: Not Available
Contact Instructions:
Not Available
Security_Information:
Security_Classification_System: None
Security_Classification: Unclassified

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Data_Quality_Information:
Lineage:
Process_Step:
Process_Description:
Metadata imported.
Source_Used_Citation_Abbreviation:
C:\DOCUME~1\jjohnson\LOCALS~1\Temp\xml15EC.tmp
Process_Date: 20100330
Process_Time: 13190500

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Spatial_Data_Organization_Information:

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Spatial_Reference_Information:

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Entity_and_Attribute_Information:

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Distribution_Information:
Distributor:
Contact_Information:
Contact_Person_Primary:
Contact_Person: Angela Morales
Contact_Organization: Howard County Government-Bureau of Environmental Services
Contact_Position: Environmental Planner
Contact_Address:
Address_Type: mailing address
Address:
6751 Columbia Garteway Drive, Suite 514
City: Columbia
State_or_Province: Maryland
Postal_Code: 21046
Country: USA
Contact_Voice_Telephone: 540-291-5211
Contact_Electronic_Mail_Address: amorales@howardcountymd.gov
Hours_of_Service: unavailable
Contact Instructions:
unavailavle
Distribution_Liability:
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Metadata_Reference_Information:
Metadata_Date: 20100330
Metadata_Contact:
Contact_Information:
Contact_Organization_Primary:
Contact_Organization: Environmental Protection Agency, Chesapeake Bay Program
Contact_Person: Jacqueline Johnson
Contact_Position: Living Resources Data Manager/Analyst

Contact_Address:
Address_Type: mailing and physical address
Address:
410 Severn Avenue, Suite 109
City: Annapolis
State_or_Province: Maryland
Postal_Code: 21403
Contact_Voice_Telephone: 410-267-5729
Contact_Electronic_Mail_Address: jjohnson@chesapeakebay.net
Metadata_Standard_Name: NBII Content Standard for National Biological Information Infrastructure Metadata
Metadata_Standard_Version: FGDC-STD-001-1998
Metadata_Security_Information:
Metadata_Security_Classification_System: None
Metadata_Security_Classification: Unclassified
Metadata_Security_Handling_Description:
None

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