2021

Ware River Intensive Watershed Study Data Files: Part 1. Nonpoint source contributions

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Document Type: Data

Department/Program: Information Technology and Network Services, Virginia Institute of Marine Science

Publication Date: December, 2021

Description: Digital files of rainfall and runoff event data for the Ware River Watershed, Gloucester Virginia. April 1979 through July 1981.

Abstract: The Ware River is a small coastal estuary draining into the Chesapeake Bay estuary. VIMS monitored the Ware watershed for rain events, runoff, and impacts to the estuary from April 1979 through July 1981. This entry contains the runoff volume, rainfall and water quality monitoring data files for the portion of the study known as Part 1 – Nonpoint source contributions. Streams and small catchments representing suburban, agricultural and forested small basins were monitored regularly and during large rainfall events to estimate pollution loading to the estuary from the watershed. Methods and results are documented in the related literature. Data files were processed using SAS ver. 9.4 software (Statistical Analysis System, SAS Institute, Inc.) and are provided in Text (.csv) format. The SAS scripts used for processing and original data files are also provided. See the readme.txt file for data dictionary and further data processing information.

Access Data Files:

File Descriptions:

File Name	Description
Readme.txt	Data Dictionary
Ware_NPS_Stations.pdf	Map of Non-Point (NPS) Stations
Ware_NPS_Runoff_WQ.csv	NPS Runoff monitoring Water Quality Data
Ware_NPS_Events_WQ.csv	NPS Storm Events Water Quality Data
Ware_Runoff_Flow_NPS2.csv	Runoff flow data for station NPS2
Ware_Runoff_Flow_NPS5.csv	Runoff flow data for station NPS5

NPS Rain Events

Ware_Runoff_Flow_NPS7.csv	Runoff flow data for station NPS7	
Ware_Runoff_Flow_NPS8.csv	Runoff flow data for station NPS8	
Ware_NPS_Rain_Daily.csv	Daily Rainfall data for stations NPS2, NPS7 and VIMS base meteorological stations.	
Ware_NPS_Runoff_WQ.sas	SAS script to process chem1 and chem2.data files	
Ware_NPS_Events_WQ.sas	SAS script to process Water Quality data	NPS Rain Events
Ware_Runoff_Flow_NPS2.sas	SAS script to process flow2.data file (station NPS2)	
Ware_NPS_Rain_Daily.sas	SAS script to process rain data file	
chem1.data, chem2.data	Original chem1 and chem2.data files of runoff	
poll1.data, poll2.data	Original Event and Water Quality data	NPS Rain Events
flow2.data, flow3.data, flow7.data, flow8.data	Original flow data files (note: flow3.data contains NPS5 data and was possibly mislabeled)	
rain.data	Original rainfall file for NPS2, 7 and VIMS base	

Additional information: README file contains the Data Dictionary for all files

Keywords: *Non-Point sources, pollution, Water Quality, Ware River, Chesapeake Bay, Virginia, Monitoring, Runoff*

Associated Publications:

Anderson, G. F., Bosco, C., & Neilson, B. (1982) Ware River intensive watershed study- Part 1. Nonpoint source contributions. Virginia Institute of Marine Science, William & Mary. https://doi.org/10.25773/4j7a-3b78

Bosco, C., Anderson, G. F., & Neilson, B. (1982) Ware River intensive watershed study - Part 2. Estuarine Receiving Water Quality. Virginia Institute of Marine Science, William & Mary. https://doi.org/10.25773/w1ge-9c78

Anderson, Gary F. and Bosco, Cindy. 1981. "Nonpoint sources and impacts in a small coastal plain estuary: a case study of the Ware River basin, Virginia. in Flynn, K. C. Nonpoint Pollution Control--Tools and Techniques for the Future: Proceedings of a Technical Symposium. Rockville, Md. : Interstate Commission on the Potomac River Basin. https://scholarworks.wm.edu/vimsbooks/159

Anderson, G. F., Bosco, C., & Neilson, B. (1983) Ware River intensive watershed study - Project Summary. Chesapeake Bay Program. EPA/600-S3-83-078. Virginia Institute of Marine Science, William & Mary. https://scholarworks.wm.edu/reports/2527

Dataset Citation:

Anderson, Gary F., "Ware River intensive watershed study Data Files: Part 1. Nonpoint source contributions" (2021). Data. William & Mary. https://doi.org/10.25773/ekzs-7k33

README FILE

Overview

VIMS monitored the Ware watershed for rain events, runoff, and impacts to the estuary from April 1979 through July 1981. This entry contains the estuarine receiving water quality monitoring data files for the portion of the study known as Part 2 – Estuarine Receiving Water Quality. A set of stations on the tidal estuarine portion of the river were sampled by-monthly during high slack tide events. The stations were also sampled during 24-hour 'intensive surveys' and immediately following storm events to document impacts.

Supporting Documentation

Results of the study, project plan, and methods and materials, appear in the final project report to the US EPA at this link:
Bosco, C., Anderson, G. F., & Neilson, B. (1982) Ware River intensive watershed study - Part 2. Estuarine Receiving Water Quality. Virginia Institute of Marine Science, William & Mary. https://doi.org/10.25773/w1ge-9c78

Data Processing Steps

Original digital files were processed using SAS ver. 9.4 software (Statistical Analysis System, SAS Institute, Inc.) and converted to text (.csv) format. The SAS scripts used for processing and original data files are also provided. Each dataset consisted of two 'pages' of data records since storage limits at the time (1980) restricted file size to 80 characters. These two pages were merged together using the SAS script and then written to a .csv file. The original files were unedited and are also provided.

The following is a cross reference of original .data files and the processed .csv files:

Original filename	**Description**	**Merged .csv filename**
wchem1.data, wchem2.data	Data files of Slack Surveys	Ware_SlackSurvey_WQ.csv
i79chem1.data, i79chem2.data	24 hour survey WQ Data	Ware_24HrSurvey79_WQ.csv

Along with the original datafiles, the original SAS format statements are also provided for each. The naming convention placed the text 'sas' as a prefix in front of each corresponding data file. For example, saschem1.data, saschem2.data, and so forth. See the original datafile folder for this information.

Original files NOT processed

For the estuarine studies numerous ancillary measurements were conducted during the three year project. These files were not converted to .csv format. The studies include sediment BOD measurements, sediment grain size, phytoplankton cell counts, tide gage records, and special surveys in Mobjack Bay. These files are provided along with the SAS format statements for each. See the EPA report for further details.

Data Dictionary:

Ware_SlackSurvey_WQ.csv:

Position	Name	Description
1	STATION	Station ID

2	STATNUM	Sequence
3	DDATE	MM-DD-YY
4	SEASON	1=Winter
5	DEPTH	Total Depth (m)
6	SAMP_DEP	Sample Depth (m)
7	DISK	Secchi Depth (m)
8	BOD5	BOD 5-Day (mg/l)
9	BOD5I	N inhibited BOD5
10	BOD30	BOD 30-Day (mg/l)
11	BOD30I	N inhibited BOD30
12	CHL_PHEO	Chlorophyl, ug/l corrected for Pheophytin
13	CHLOR	Chlorophyl, ug/l
14	DO	Dissolved Oxygen, mg/l
15	DOSAT	DO Calculated 100% saturation, mg/l
16	PERCENT	% DO Saturation
17	PHEO	Pheophytin, ug/l
18	SAL	Salinity, ppt
19	SILICA	Dissolved Silica, mg/l
20	SS	Total non-filterable residue, mg/l
21	TEMP	Water Temperature, Degrees C
22	TOC	Total Organic carbon, mg/l
23	ALK	Alkalinity, mg/l as carbonate
24	PH	pH
25	OPF	Dissolved orthophosphorus, mg/l
26	TPF	Total dissolved phosphorus, mg/l
27	TP	Total phosphorus, mg/l
28	TKN	Total Kjeldahl nitrogen, mg/l
29	TKNF	Diss. total Kjeldahl nitrogen, mg/l
30	NH3	Total ammonia nitrogen, mg/l
31	NH3F	Dissolved ammonia nitrogen, mg/l
32	NO2	Total nitrite nitrogen, mg/l
33	NO2NO3	Total nitrite+nitrate nitrogen, mg/l
34	INORGN	NH3F + NO2NO3, mg/l
35	ORGN	TKN minus Dissolved ammonia N, mg/l

Ware_24HrSurvey79_WQ.csv:

Position	Name	Description
1	STATION	Station ID
2	STATNUM	Sequence
3	DATE	MM-DD-YY
4	DEPTH	Total Depth (m)
5	DISC	Secchi Depth (m)
6	TIME	HH:MM
7	BOD5	BOD 5-Day (mg/l)

8	BOD5I	N inhibited BOD5
9	BOD30	BOD 30-Day (mg/l)
10	BOD30I	N inhibited BOD30
11	CHL_PHEO	Chlorophyll, ug/l corrected for Pheophytin
12	CHLOR	Chlorophyll, ug/l
13	DO	Dissolved Oxygen, mg/l
14	DOSAT	DO Calculated 100% saturation, mg/l
15	PHEO	Pheophytin, ug/l
16	SAL	Salinity, ppt
17	TEMP	Water Temperature, Degrees C
18	ALK	Alkalinity, mg/l as carbonate
19	PH	pH
20	OP	Dissolved orthophosphorus, mg/l
21	TPF	Total dissolved phosphorus, mg/l
22	TP	Total phosphorus, mg/l
23	TKN	Total Kjeldahl nitrogen, mg/l
24	NH3	Total ammonia nitrogen, mg/l
25	NH3F	Dissolved ammonia nitrogen, mg/l
26	NO3	Total nitrate nitrogen, mg/l
27	TN_TP	TN/TP ratio
28	TIN_SRP	TIN/SRP ratio
29	SUSPSOL	Total non-filterable residue, mg/l
30	INORGN	NH3F + NO2NO3, mg/l
31	ORGN	Total organic nitrogen, mg/l

Ware_24HrSurvey80_WQ.csv:

Position	Name	Description
1	STATION	Station ID
2	STATNUM	Sequence
3	SER	Time sequence
4	DUP	Q/A Duplicate number (Page 15)
5	DDATE	MM-DD-YY
6	DEPTH	Total Depth (m)
7	SAMP_DEP	Sample Depth (m)
8	DISK	Secchi Depth (m)
9	TTIME	HH:MM
10	TIDESTAK	Tide level (m)
11	BOD5I	N inhibited BOD5
12	BOD30I	N inhibited BOD30
13	CHL_PHEO	Chlorophyll, ug/l corrected for Pheophytin
14	CHLOR	Chlorophyll, ug/l
15	DO	Dissolved Oxygen, mg/l
16	DOSAT	DO Calculated 100% saturation, mg/l

17	PERCENT	% DO Saturation
18	PHEO	Pheophytin, ug/l
19	SAL	Salinity, ppt
20	SILICA	Dissolved Silica, mg/l
21	SS	Total non-filterable residue, mg/l
22	TEMP	Water Temperature, Degrees C
23	ALK	Alkalinity, mg/l as carbonate
24	PH	pH
25	OPF	Dissolved orthophosphorus, mg/l
26	TP	Total phosphorus, mg/l
27	TKN	Total Kjeldahl nitrogen, mg/l
28	NH3	Total ammonia nitrogen, mg/l
29	NH3F	Dissolved ammonia nitrogen, mg/l
30	NO2	Total nitrite nitrogen, mg/l
31	NO2NO3	Total nitrite+nitrate nitrogen, mg/l
32	TOC	Total Organic carbon
33	INORGN	NH3F + NO2NO3, mg/l
34	ORGN	Total organic nitrogen, mg/l

Ware_24HrSurvey81_WQ.csv:

Position	Name	Description
1	STATION	Station ID
2	STATNUM	Sequence
3	SER	Time sequence
4	DUP	Q/A Duplicate number (Page 15)
5	DDATE	MM-DD-YY
6	DEPTH	Total Depth (m)
7	SAMP_DEP	Sample Depth (m)
8	DISK	Secchi Depth (m)
9	TTIME	HH:MM
10	BOD5I	N inhibited BOD5
11	CHL_PHEO	Chlorophyl, ug/l corrected for Pheophytin
12	CHLOR	Chlorophyll, ug/l
13	DO	Dissolved Oxygen, mg/l
14	DOSAT	DO Calculated 100% saturation, mg/l
15	PERCENT	% DO Saturation
16	PHEO	Pheophytin, ug/l
17	SAL	Salinity, ppt
18	SILICA	Dissolved Silica, mg/l
19	SS	Total non-filterable residue, mg/l
20	TEMP	Water Temperature, Degrees C
21	ALK	Alkalinity, mg/l as carbonate
22	PH	pH
23	OPF	Dissolved orthophosphorus, mg/l

24	TP	Total phosphorus, mg/l
25	TKN	Total Kjeldahl nitrogen, mg/l
26	TKNF	Diss. total Kjeldahl nitrogen, mg/l
27	NH3F	Dissolved ammonia nitrogen, mg/l
28	NO2	Total nitrite nitrogen, mg/l
29	NO2NO3	Total nitrite+nitrate nitrogen, mg/l
30	TOC	Total Organic carbon, mg/l
31	INORGN	NH3F + NO2NO3, mg/l

Ware_NPS_Rain_Daily.csv

Position	Name	Type	Description
1	DATE	Char	Date (MMDDYY)
2	DDATE	Char	MM-DD-YY
3	NPS2	Char	Rain (inches)
4	NPS7	Char	Rain (inches)
5	VIMS	Char	Rain (inches)