Bridgewater State University
Virtual Commons - Bridgewater State University

Watershed Access Lab Projects | Watershed Access Lab

12-5-2005

A Comparison of Divergent Sites on the Farm River: Wetlands vs. Industry

Follow this and additional works at: https://vc.bridgew.edu/wal_projects

Part of the Environmental Monitoring Commons, and the Natural Resources and Conservation Commons

Recommended Citation

Braintree High School, Braintree, Massachusetts (2005). *A Comparison of Divergent Sites on the Farm River: Wetlands vs. Industry*. In Watershed Access Lab Projects. Project 39.
Available at: https://vc.bridgew.edu/wal_projects/39

This item is available as part of Virtual Commons, the open-access institutional repository of Bridgewater State University, Bridgewater, Massachusetts.

A Comparison of Divergent Sites on the Farm River:

Wetlands vs. Industry

Braintree High School, Braintree

The Farm River
Braintree, Massachusetts

- Part of the Fore River Watershed
- Begins in the Blue Hills, Milton, MA
- Flows in a southwest direction
- Joins the Monatiquot River in Braintree
- Empties into the Fore River Basin, Braintree/Weymouth line

WAKEFIELD
SALEM
BEDFORD
BURLINGTON
WOBURN
SAUGUS
LYNN
SWAMPSCOTT
MELROSE
WINCHESTER
LEXINGTON
NAHANT
LINCOLN
MEDFORD
MALDEN
REVERE
ARLINGTON
EVERETT
CHELSEA
WALTHAM
WINTHROP
WATERTOWN
WESTON
NEWTON
BOSTON
WELLESLEY
HULL
NEEDHAM
QUINCY
DEDHAM
MILTON
HINGHAM
COHASSET
DOVER
WESTWOOD
BRAINTREE
SCITUATE
MEDFIELD
WEYMOUTH
NORWOOD
CANTON
RANDOLPH
NORWELL
HOLBROOK
ROCKLAND
WALPOLE
STOUGHTON
AVON
ABINGTON
HANOVER
SHARON
WHITMAN
BROCKTON
HANSON
PEMBROKE
FOXBOROUGH
EASTON
EAST
BRIDGEWATER
HALIFAX
KINGSTON
BRIDGEWATER
PLYMPTON
MIDDLEBOROUGH
FORE RIVER WATERSHED
WATER
CRANBERRY BOGS
TIDAL FLATS
WETLANDS
Interstate Highways
U.S. Routes
State Routes
Town Boundary
Basin System Boundary
Major Basin Boundary
Tributary Basin Boundary (where available)
DATA SOURCES:
HYDROGRAPHY
POLITICAL BOUNDARIES
Department of Fisheries, Wildlife & Environmental Law Enforcement
MASS GIS
SCALE 1:150,000
PRODUCED ON: July 25, 1997

Hypothesis

If a river flows through an industrial area, its macroinvertebrate population will be deleteriously affected due to reduced water quality.

Methods

- Timed sweeps at each site – 3 minutes
  - Two upstream
    - One fast current, one slow current
  - Two downstream
    - One fast current, one slow current
- Sweeps combined at each site for total macroinvertebrate count

- Biotic index calculation based on total grids needed to obtain 100 organisms from samples
- Macroinvertebrates were identified using

  A Guide to Common Freshwater Invertebrates of North America
- Macroinvertebrates were categorized and tallied by the Braintree High School Environmental Club

Site Selection

- Wetlands:
  - River is adjacent to wetlands/open space on northeast side, which is uphill in watershed
  - River has stretch of industry on southwest side, which is downhill in watershed
  - Conditions to access river further upstream, prior to any industry, proved dangerous

Goldman Environmental Cnsltnts
Blue Hill Cemetery
Ridge Athletic Club
Farm River
Pond Reservoir
Great Pond
Farm River before industry
Image MassGIS, Commonwealth of Massachusetts EOEA
Image © 2005 Sanborn
Google
Pointer 42°12'26.41" N 71°02'19.22" W elev 114 ft
Streaming 99%
Eye alt 3344 ft

Farm River before industry

EXPRESS

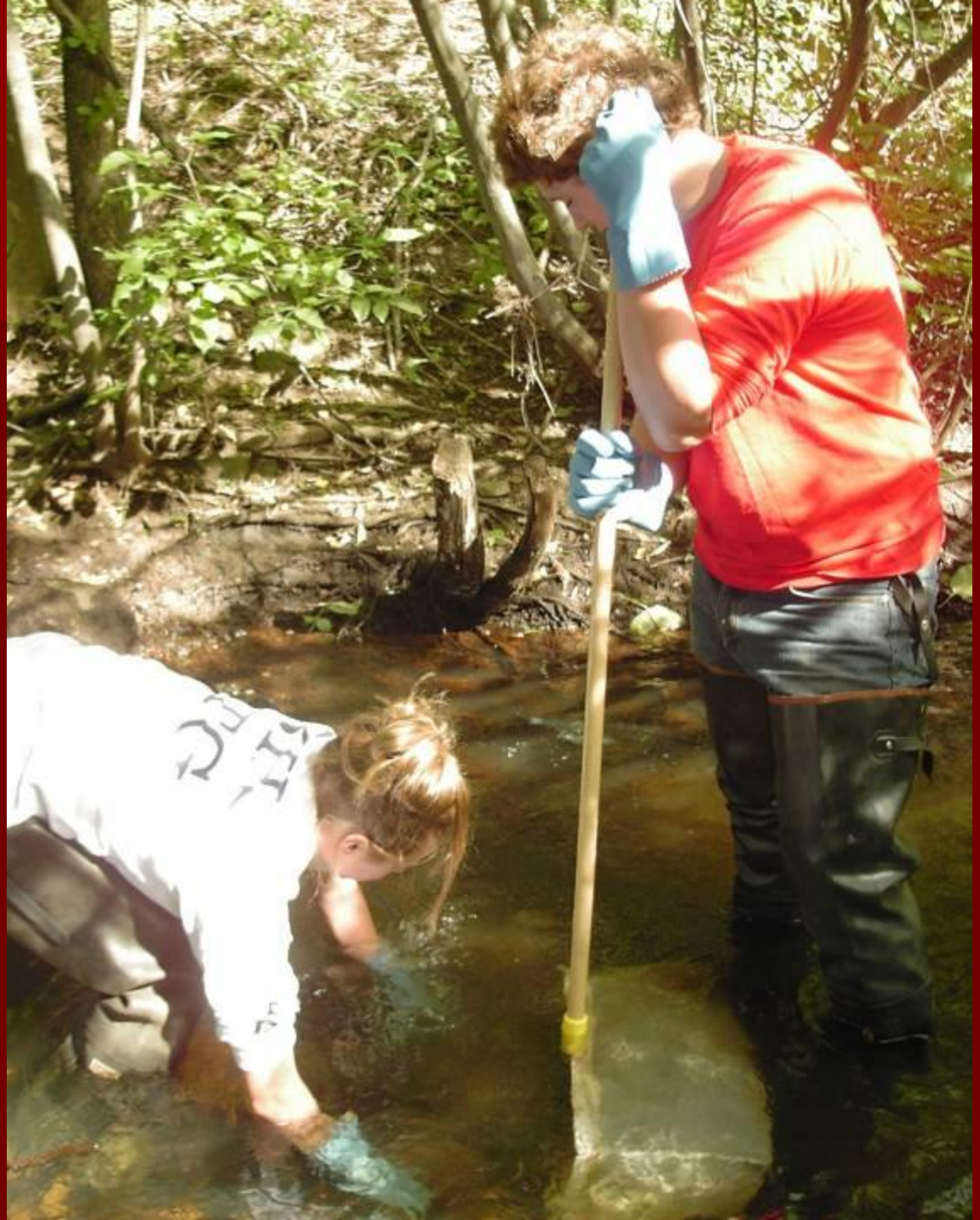
BHS

Site Selection

- Industry:
  - River passed between an industrial park and a shopping plaza for approximately 0.5 km
  - River passed under heavily traveled Granite Street
  - Traffic includes commercial vehicles using industrial park

Mall
Farm River
Granite Street
BHS
Campanelli
Industrial Park
*
Farm River
after industry
Image MassGIS, Commonwealth of Massachusetts EOEA
Image © 2005 Sanborn
Google

Campanelli
Industrial Park
FOR SALE
OR LEASE



GHS

Results

Table 1

Macroinvertebrate Comparison in the Farm River, Braintree, MA Wetland and Industry Sites Collected October 2, 2005

	Wetlands	Industry
Total Organism Density	**648**	**360**
Biotic Index	**5.2**	**5.5**
Water Quality Rating	**Fair**	**Fair**

Table 2

Macroinvertebrate Comparison
in the Farm River, Braintree, MA
Wetland (W) and Industry (I) Sites

Collected October 2, 2005

Sorted by Order

Major Group	Average Count		Average Organism Density		%Composition of Five Dominant Families		Major Group Biotic Index		Number of Tolerent		Number of Intolerant	
	W	I	W	I	W	I	W	I	W	I	W	I
Ephemeroptera	0	2	0	7						X		
Plecoptera	3	0	18	0							X	
Trichoptera	30	19	180	68	28	19					X	X
Diptera: Other	5	3	30	11	5				X	X		
Diptera: Odonata	0	1	0	4								
Coleoptera:	0	18	0	65		18				X		
Adult		7		26						X		
Amphipoda	10	0	60	0	9				X			
Isopoda	4	0	24	0					X			
Decapoda	45	24	270	86	42	24			X	X		
Gastropoda	11	8	66	29	10	8			X	X		
Oligochaeta	0	17	0	61		17				X		
Hirudinea	0	1	0	4						X		
TOTAL	108	100	648	360	94	86	5.2	5.5	5	8	2	1

Table 4
Macroinvertebrate Density
Farm River Industry Site
10/2/05

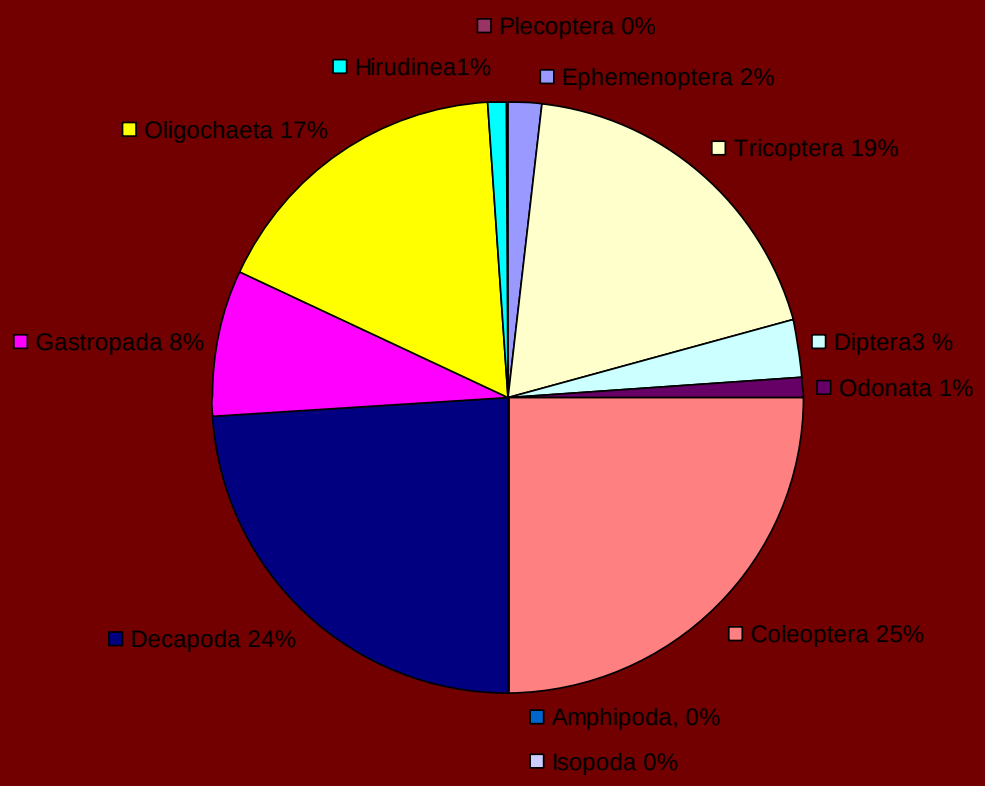
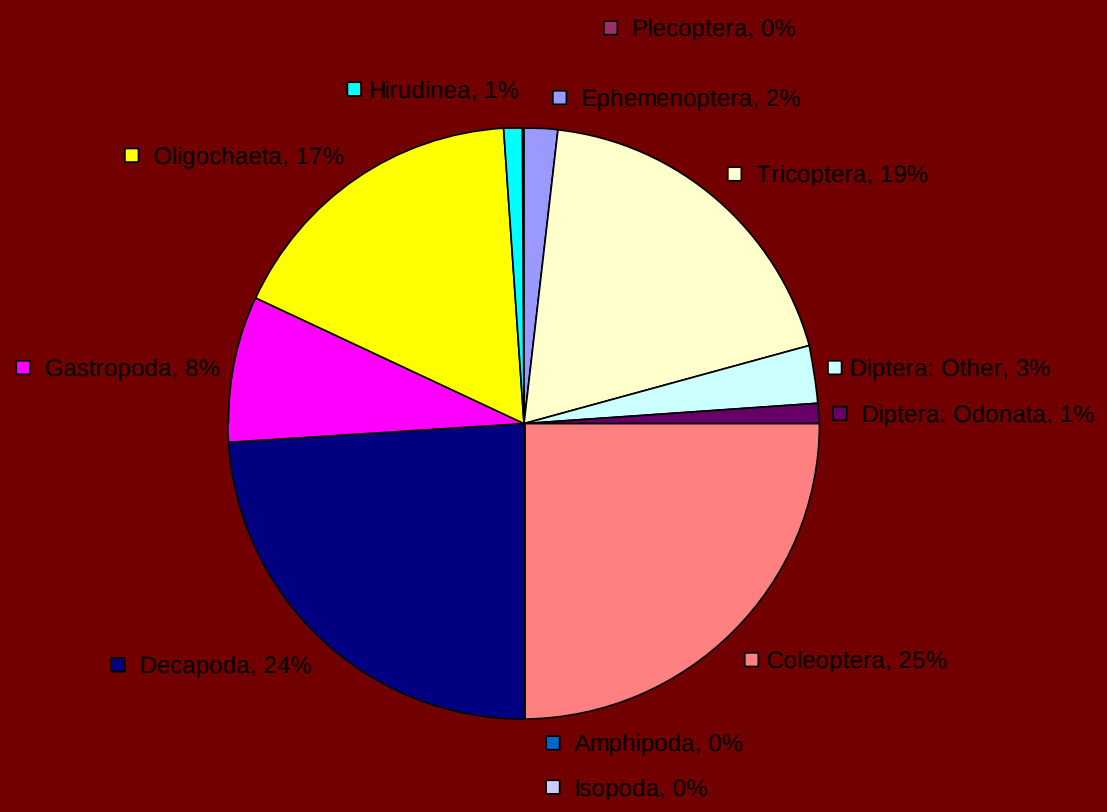


Table 3
Macroinvertebrate Density
Farm River Wetlands Site
10/2/05



Discussion

- Environmental comparisons:
  - Minor differences in site canopy and vegetative borders immediately adjacent to each
  - Wetlands site was slightly narrower and deeper
  - Wetlands had large amount of vegetative growth under the water, rock and silt substrate
  - Substrate was mostly sand and rock at industry site

- Large area of imperviousness at Industrial site
- Wetlands site bordered on one side by impervious area
- 200 ft buffer zone does not exist along length of Farm River studied

Conclusion

- The water quality decreased after passing through the industrial area which supports our hypothesis
- However, significant differences in water quality between the Wetland and Industrial sites did not prove true
- Both sites had fair water quality ratings
- This may be due to our inability to sample a site away from industry
- Further study is needed

Concerns

- The Fore River Watershed supplies our town with its drinking water from Great Pond
- The Farm River feeds Great Pond
- We are concerned that the Farm River has a FAIR water quality rating

Extensions

- Chemical analysis
- Temperature analysis
- Substrate analysis
- Macroinvertebrate study over time
- Access Farm River further upstream away from industry for comparison study
- Consult with the Water Department and Conservation Committee

Acknowledgements

Thank you Bridgewater State College and the Watershed Team for providing us with the opportunity to learn more about our environment.