

Statewide Occurrence and Seasonal Abundance Patterns for *Didymo* in Maryland Waters

Katherine V. Hanna and Ronald J. Klauda
Maryland Department of Natural Resources



Study Overview

Presence of the freshwater diatom *Didymosphenia geminata* in Gunpowder Falls was reported to the Maryland Department of Natural Resources (MDNR) in January 2008 by anglers. This set a series of monitoring events in motion:

- April 2008 - MDNR confirmed the finding and has been charting the extent and spread of *Didymo* ever since.

- In June 2008, nine stations along the middle region of Gunpowder Falls below Prettyboy Reservoir were established to determine the extent of the *Didymo* infestation and to describe seasonal abundance patterns. These stations are being visited monthly to visually survey for *Didymo* presence, collect substrate samples for microscopic examination, and measure water temperature, current velocity, and turbidity. The data reveal a seasonal pattern in the abundance and spatial distribution of the diatom in Gunpowder Falls. Peak monthly abundance occurs from January through May at the five most upstream stations.

- An additional station was added in the river above the dam in September 2009, but this location is still *Didymo*-free.

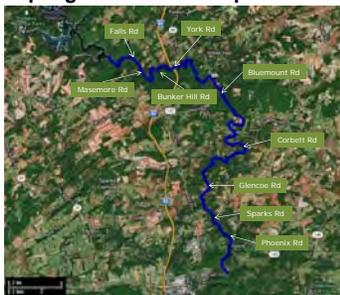
- In October, benthic macroinvertebrate sampling was included in the survey and a nearby stream without *Didymo* was set up as a control site, to provide insight into the effects of *Didymo* on invertebrates.

- In June 2009, *Didymo* was found in western Maryland's Savage River, 1.8 km upstream from its confluence with the Potomac River.

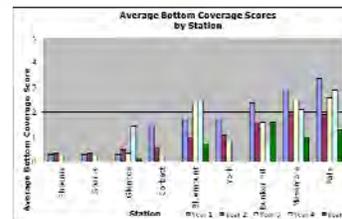
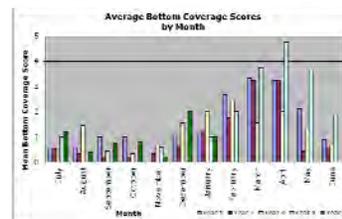
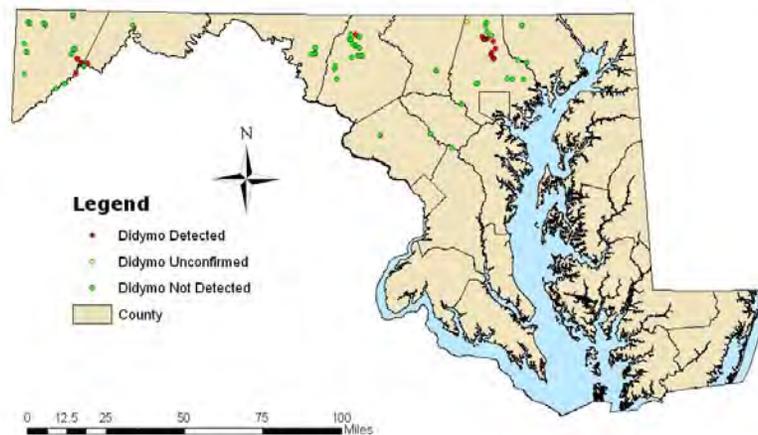
- Through several control measures instituted by MDNR and an effort to educate the public, the spread of *Didymo* was halted until 2012, when new occurrences were confirmed in Hunting Creek and North Branch Potomac River.

DNA testing has been done in numerous streams across the state since June 2009. Results point to the containment of *Didymo* to these four known areas.

Sampling Stations in Gunpowder Falls



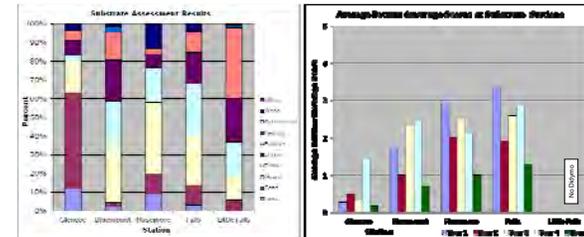
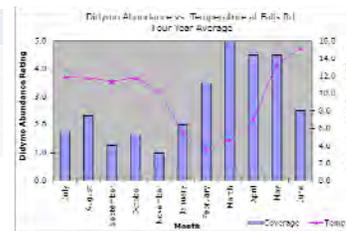
The Search for *Didymo* Across Maryland



- Peak *Didymo* bloom occurs between February and May, and increases in intensity the nearer a station is located to Prettyboy Dam upstream.
- *Didymo* abundance increases following the winter drop in water temperature, then decreases once temperatures begin to rise.
- Individual high-flow events depress *Didymo* blooms temporarily, but seem ineffective in achieving long-term reductions.

Didymo Survey Year	Mean Annual Didymo Abundance - Falls Rd	Mean Annual Didymo Abundance - Masemore Rd	Mean Annual Didymo Abundance - Blumount Rd	Monthly Mean Discharge (CFS) - USGS Gage 01581920	Minimum Monthly Mean Discharge (CFS) - USGS Gage 01581920	Maximum Monthly Mean Discharge (CFS) - USGS Gage 01581920
Year 1: Jul 2008 - Jun 2009	3,364	2,909	1,727	78,558	24	773
Year 2: Jul 2009 - Jun 2010	2,167	2,000	1,000	126,187	26	1810
Year 3: Jul 2010 - Jun 2011	2,583	2,500	2,333	90,915	27	731
Year 4: Jul 2011 - Jun 2012	2,889	2,111	2,444	143,451	18	9000

- Falls Road consistently had the highest *Didymo* abundance across all Gunpowder stations.
- Maximum discharge of 9000 cfs in Year 4 had little effect on the annual average abundance.



Substrate size, stability, and availability is likely to also play a role in *Didymo*'s ability to colonize an area. A modified pebble count was conducted at four stations in Gunpowder Falls and one at the *Didymo*-free control site in Little Falls in late 2012. Results support observations that *Didymo* prefers larger, less transitory substrate such as cobble, boulder, and bedrock as seen at Blumount, Masemore, and Falls Rd. stations. The large amount of sand at Glencoe Rd. station is likely to shift frequently and provide minimal stable habitat for *Didymo*.

Wader Wash Stations



The Maryland Department of Natural Resources has taken steps to reduce the likelihood of spreading *Didymo* and other unwanted organisms to uninfested waters:

- 45 Wader wash stations have been deployed, beginning in June 2008
- Statewide felt-soled boot ban implemented in March 2011