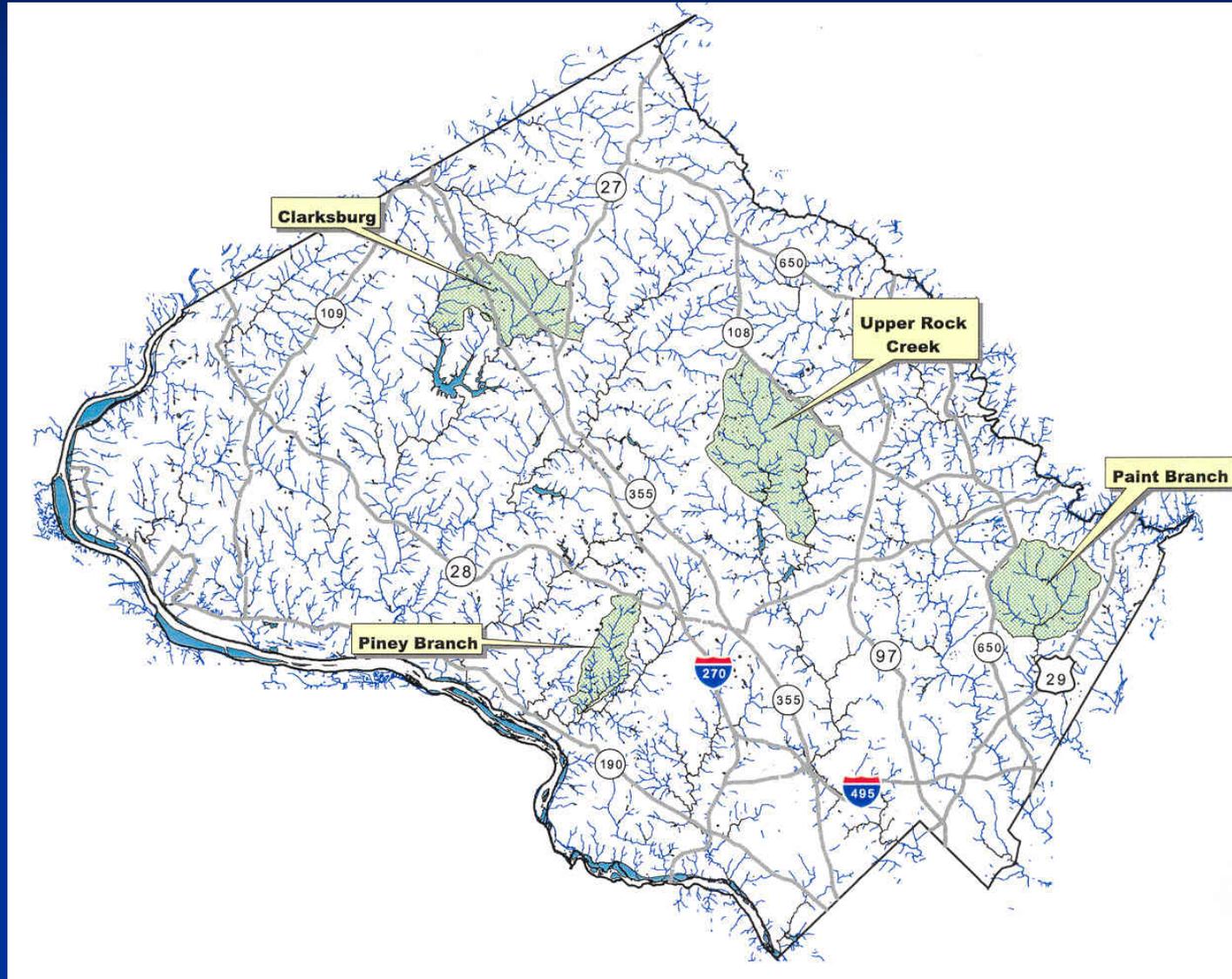


'The Clarksburg Project: Purpose and Ongoing Collaborative Efforts'

Keith Van Ness,
Senior Water Quality Specialist,
Montgomery County DEP

Clarksburg Study Area



Meeting the needs of environmental decision-making for sustainability



- Documenting ecosystem response/recovery to long term and significant landscape changes
- Documenting effectiveness of sediment and erosion control and SWM best management practices
- Providing feedback to decision-makers regarding development and SWM design
- Devising more focused research questions based on the needs of managers and decision-makers

Ongoing Collaboration in the Clarksburg Study Area

- **DPS**
- **MNCPPC**
- **Univ. of MD, College Park campus**
- **USGS Water Resources Division, Baltimore MD**
- **USGS, Reston VA**
- **USEPA**
 - **Landscape Ecology Branch, Reston VA**
 - **National Risk Management Research Laboratory, Cincinnati OH**
 - **Office of Research and Development, Atlanta GA**
 - **Environmental Science Center, Ft. Meade, MD**
- **Participating Consultants Include:**
 - **Environmental Systems Analysis, Inc.**
 - **LSA**



Collaborative Approach

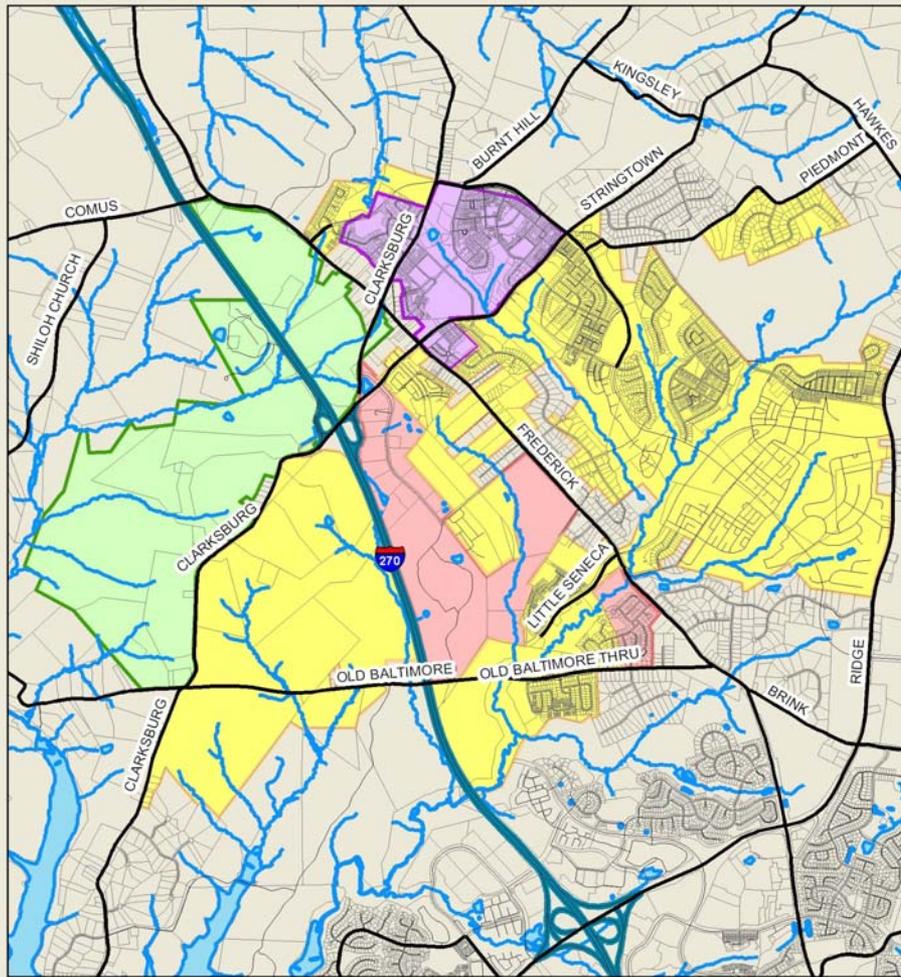
- Better understanding of the results of land use decisions
- Comprehensive approach
- Document effectiveness of land-use planning and use of modern BMP's
- No single partner could accomplish study alone

Currently Undergoing Rapid Land-use Change



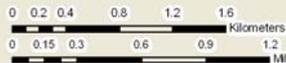
- Site of next Neo-traditional town
- Special Protection Area
- Create sustainable communities
- Medium to high imperviousness
- Extensive SWM controls

Clarksburg: Staging of Development



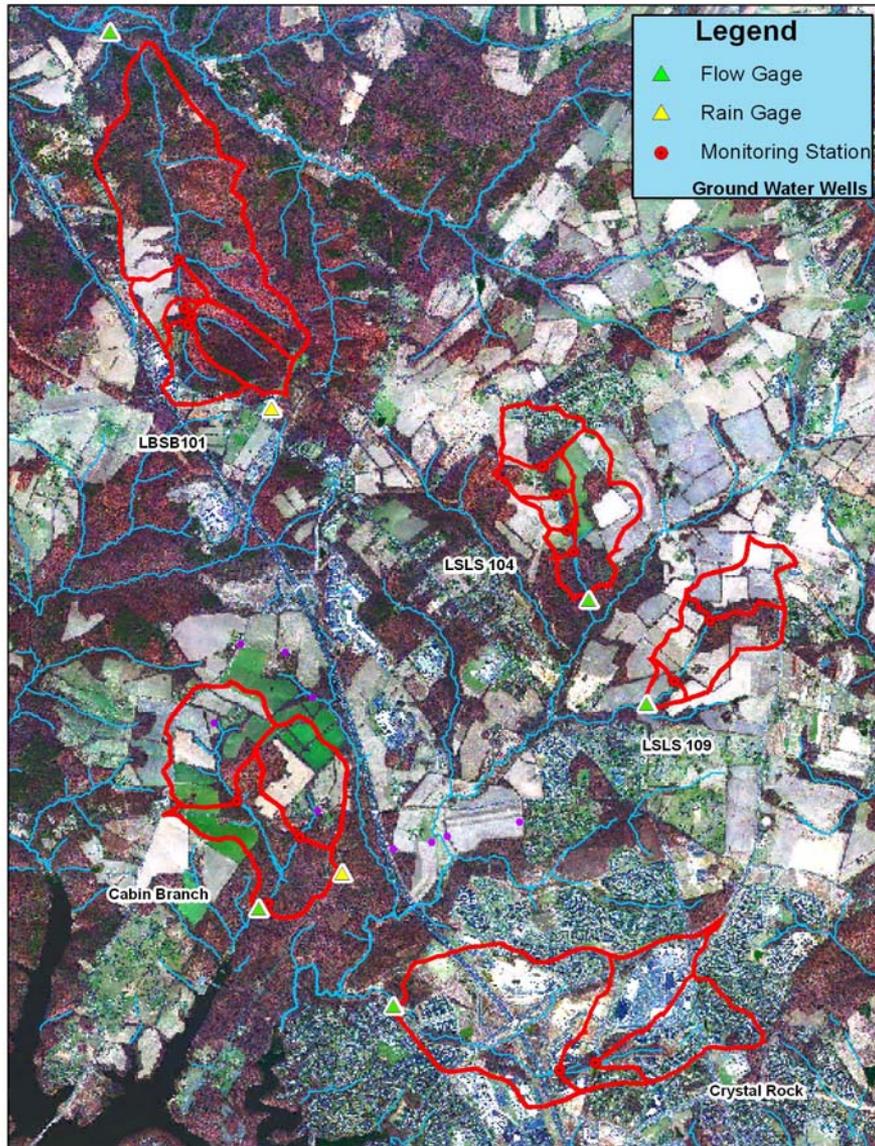
Development Stage

- 1 - Development with Existing Sewer Authorizations
- 2 - Town Center
- 3 - Cabin Branch & East Side
- 4 - Ten Mile Creek

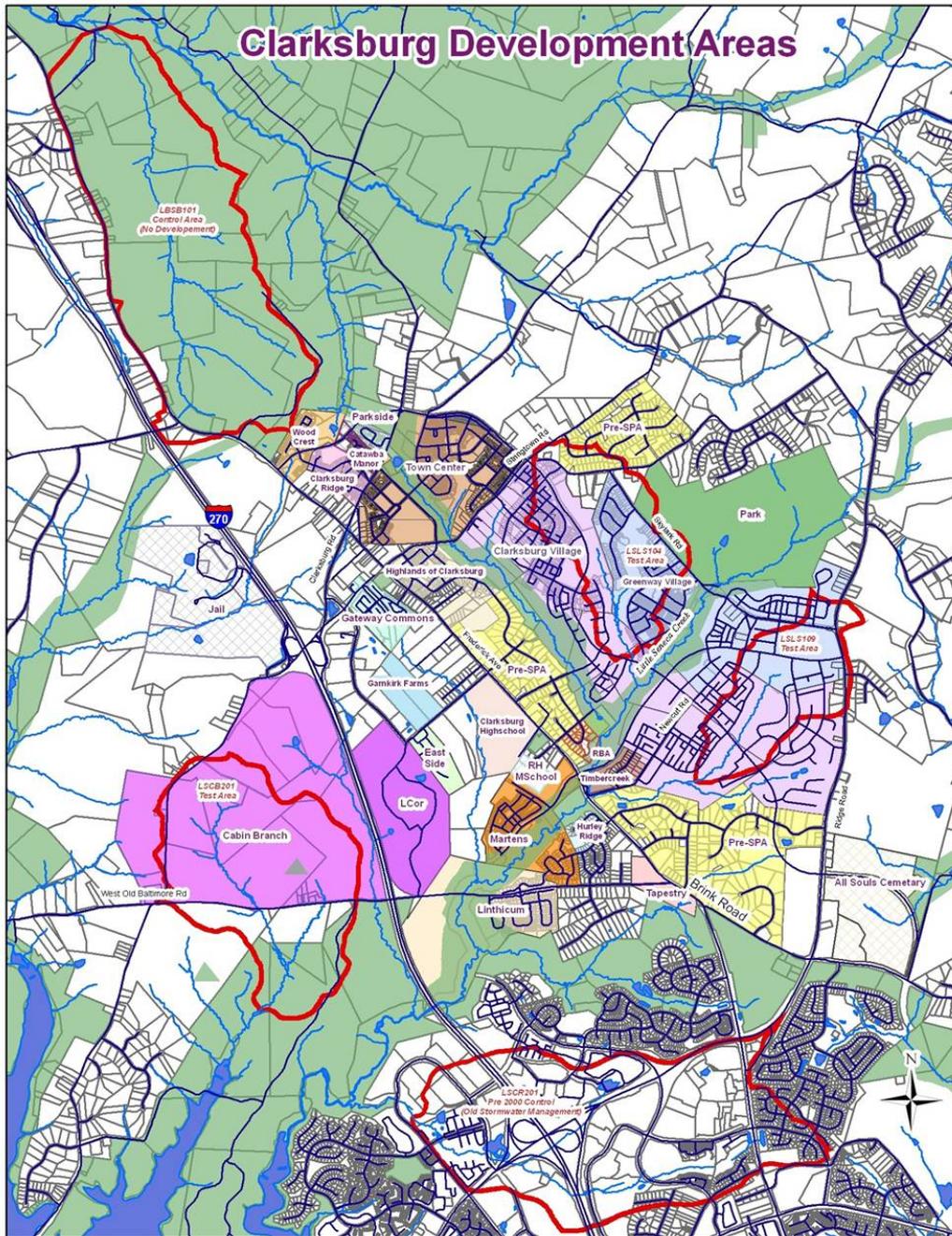


- Clarksburg is to be developed in Stages
- Each with it's own triggers

Collaborative Study Approach



- **Monitoring the relationships between precipitation, stream flow, groundwater levels and related changes in geomorphology and biology**
- **How changes in land use and land cover alter these relationships**



BACI Approach

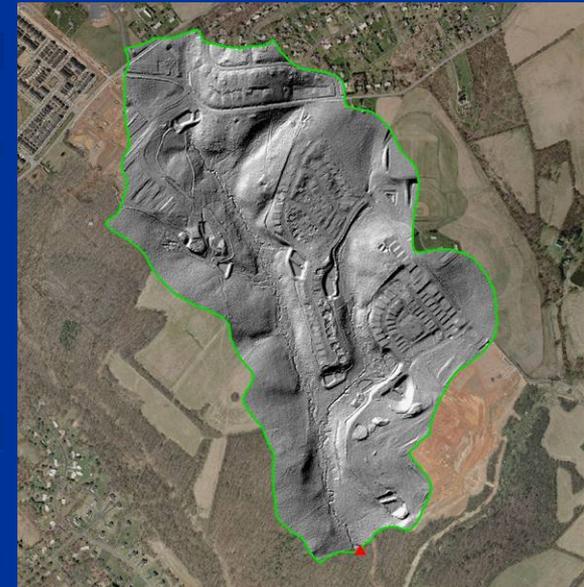
2 Control drainages

3 Test areas

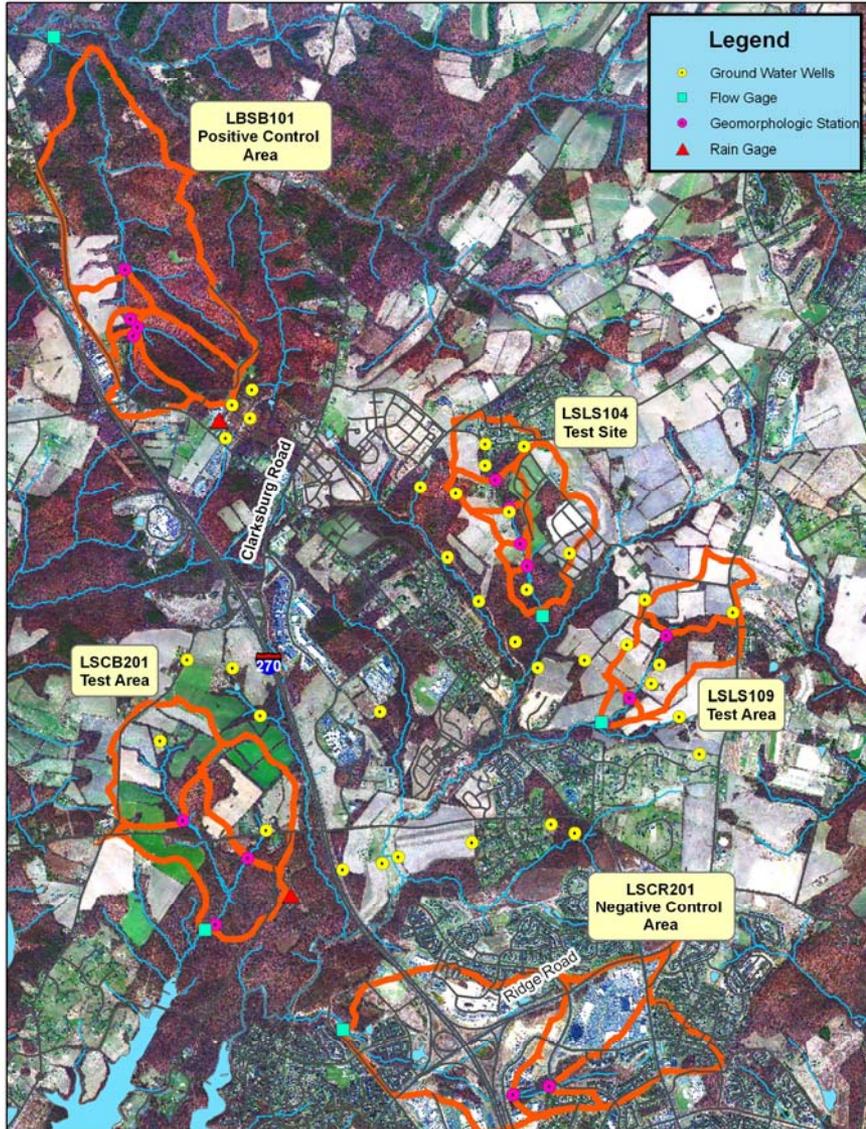
5 USGS stream gages

2 rain gages

LiDAR overflights



Small Watershed Areas

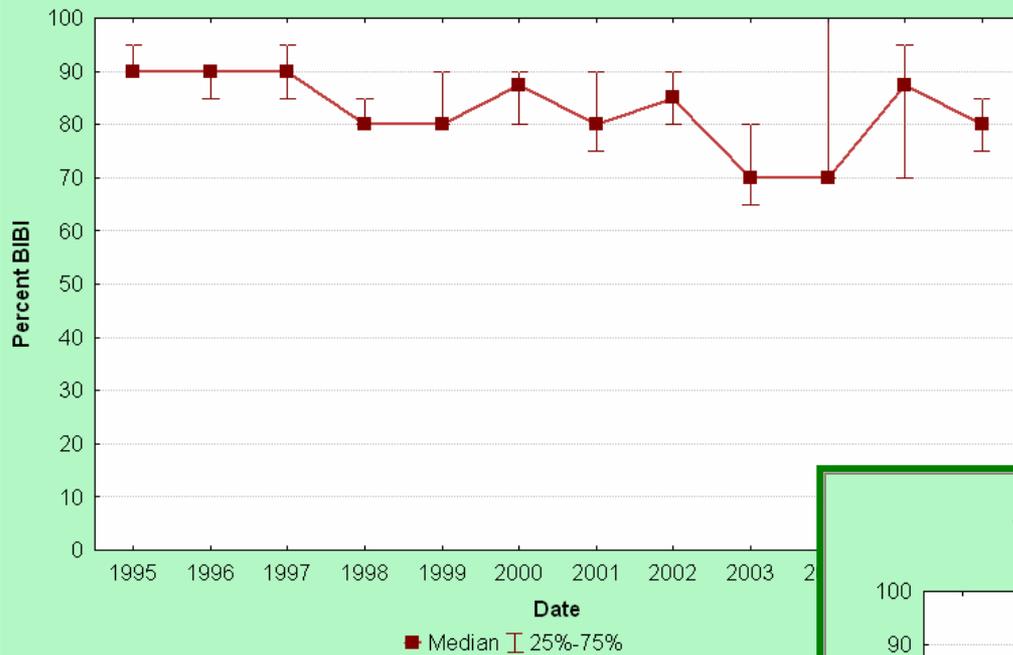


- Each watershed has a USGS surface water gage
- Extensive geomorphology surveys
- Biological monitoring
- Water temperature
- Nested groundwater wells
- Stream ecosystem structure and functional changes

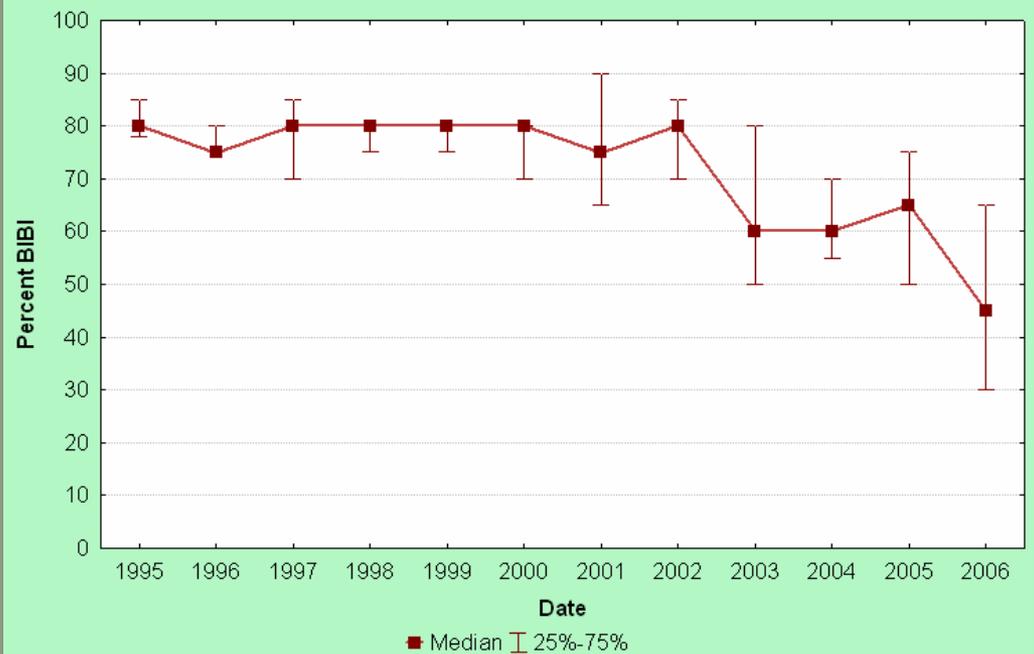
Montgomery County Data

- 1994 to 2007 Biological Monitoring
 - Fish
 - Benthic Macroinvertebrates
 - Habitat
- Water Temperature
- Rainfall (5 minute interval)
- Geomorphology
 - Cross section
 - Profile
 - Pebble Count
 - Sinuosity
- BMP Monitoring Database (Spring 2008)
- ArcMapping of BMP Monitoring Locations (Spring 2008)

Clarksburg SPA **Control** sites
Time Series in Median % Benthic Index of Biotic Integrity (BIBI)
from 1995 to 2006

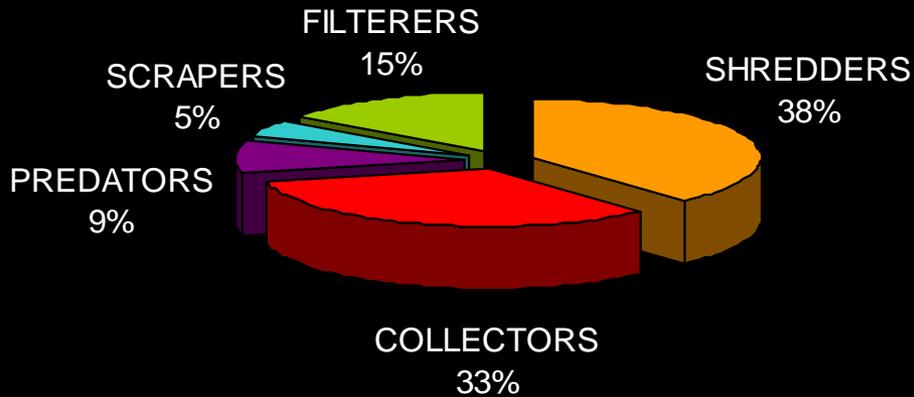


Impacted Clarksburg SPA sites
Time Series in Median % Benthic Index of Biotic Integrity (BIBI)
from 1995 to 2006



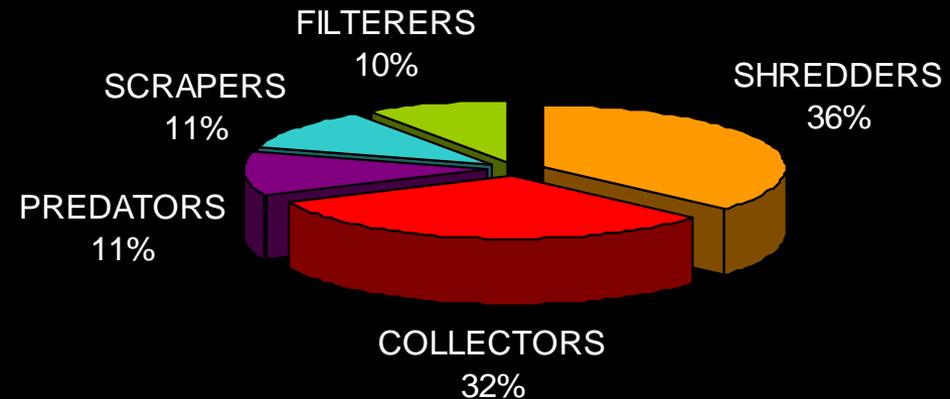
Changes in Benthic Macroinvertebrate Community Composition (Control Sites)

1996-2000



Dominant Taxa:
Amphinemura = 33% Shredder
Chironomidae = 21% Collector
N = 24, Total # of Stations = 7

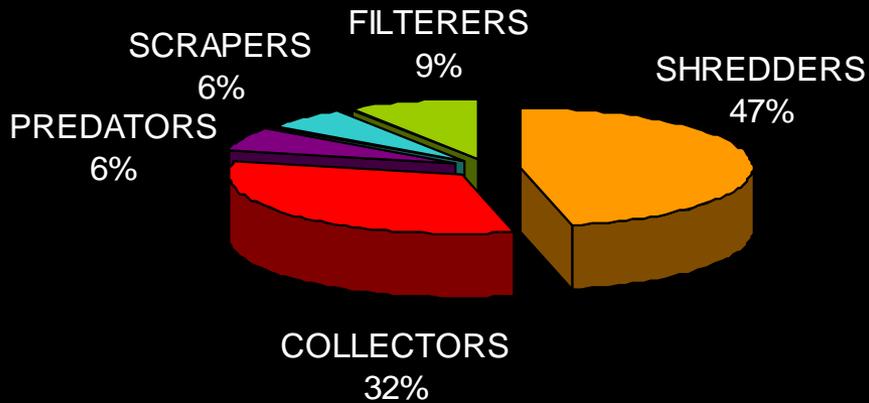
2003-2006



Dominant Taxa:
Amphinemura = 34% Shredder
Orthoclaadiinae = 13% Collector
N = 17, Total # of Stations = 7

Changes in Benthic Macroinvertebrate Community Composition (Impacted Sites)

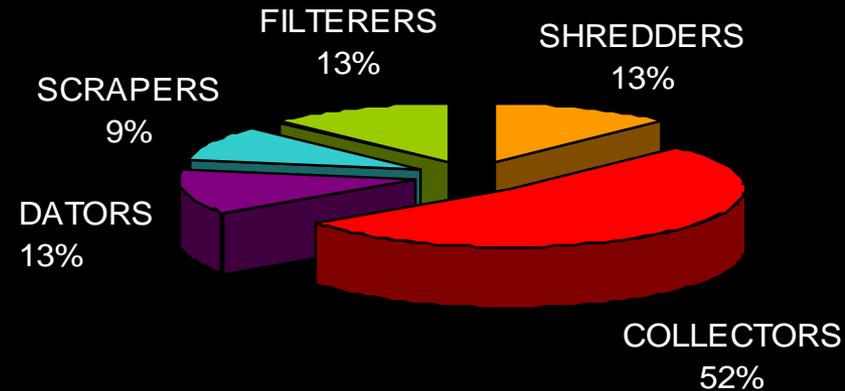
1996-2000



Dominant Taxa:

Amphinemura= 43% Shredder
 Chironomidae= 20% Collector
 N= 35, Total # of Stations = 9

2003-2006



Dominant Taxa

Orthoclaadiinae = 24% Collector
 Chironimini= 13% Collector
 N = 31, Total # of Stations = 9

Little Seneca 104 Tributary (Area 1 X-Section 1)

