

## BENTHIC INDEX OF BIOTIC INTEGRITY (B-IBI)

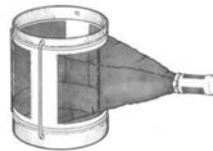
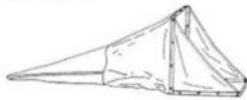
A B-IBI is a multi-metric index for assessment of a stream's ecological health using aquatic macroinvertebrate species found in a sample area as the indicators. These indices utilize 12 metrics based on drainage area and ecoregions and include species richness and composition, trophic structure, and abundance (see table below for full list). In comparison, the following can be expected when comparing tailwaters and similar free-flowing rivers:

- 1) Tailwaters have greater relative abundance of insects compared to free-flowing rivers.
- 2) Tailwaters have lower diversity of insects compared to most free-flowing rivers.

### Benthic Macroinvertebrate

#### Aquatic Insect Sampling

Quantitative sampling consists of six (6) samples 1 ft. X 1 ft. each using Surber and Hess samplers



Qualitative sampling consists of "grabs" using a benthic net in each available habitat such as vegetation, root wads, rocks, woody debris, substrate, etc.

PLACE THE TITLE OF THE PRESENTATION HERE?



Metric Scoring Criteria for Benthic Index of Biotic Integrity*				
Metric	Gear	Scoring Criteria		
		1	3	5
<b>Taxa Richness and community composition</b>				
1. Taxa richness	Surber or Hess**	< 9	9-17	=>18
2. Occurrence of intolerant mollusk Taxa	Combined	0	1-2	=> 3
3. Number of mayfly taxa	Surber or Hess	< 3	3-5	=> 6
4. Number of stonefly taxa	Surber or Hess	< 2		=>2
5. Number of caddisfly taxa	Surber or Hess	< 2	2-3	=>4
6. Number of EPT taxa	Combined	<14	14-24	=>25
7. Percent individuals as oligochaets	Surber or Hess	=> 0.05	0.01-0.049	<0.01
8. Percent individuals of two dominant taxa	Surber or Hess	=> 0.75	0.5-0.749	<0.5
<b>Trophic and Functional-feeding Groups</b>				
9. Percent individuals as omnivores and scavengers	Surber or Hess	=>0.9	0.6-0.89	<0.6
10. Percent individuals as collectors/filterers	Hess	=>0.5	0.2-0.49	<0.2
	Surber	=>0.6	0.3-.59	<0.3
11. Percent individuals as predators	Surber or Hess	=<0.04		>0.04
<b>Abundance</b>				
12. Total abundance in quantitative samples***	Hess	=<50	50-200 >600	201-600
	Surber	=<40	40-160 >600	161-600
<p>* TVA's version of BIBI metrics and metric scoring criteria are modified from Kerans and Karr, 1994. A benthic index of biotic integrity (B-IBI) for rivers of the Tennessee Valley. in Ecological Applications. 4(4), pp. 768-785.</p> <p>** Metric score is the average of individual hess and surber samples</p> <p>*** Low scores are given for both high and low values.</p>				

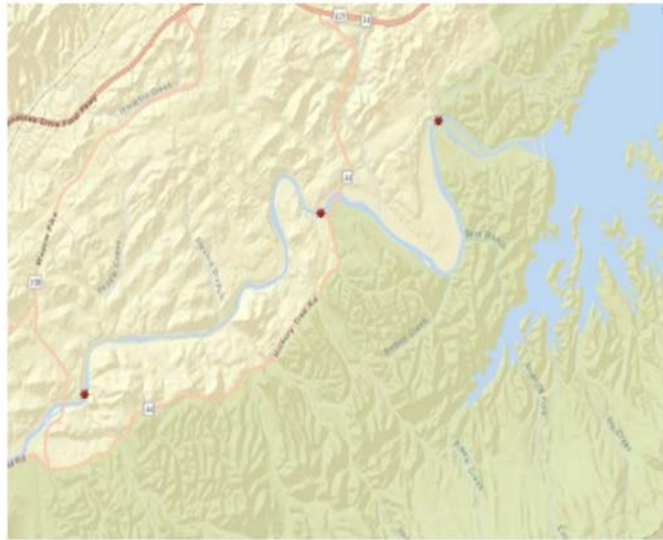


## South Holston Tailwater Monitoring Locations

Below Weir SfHRM 49.2

Hickory Tree SfHRM 44.4

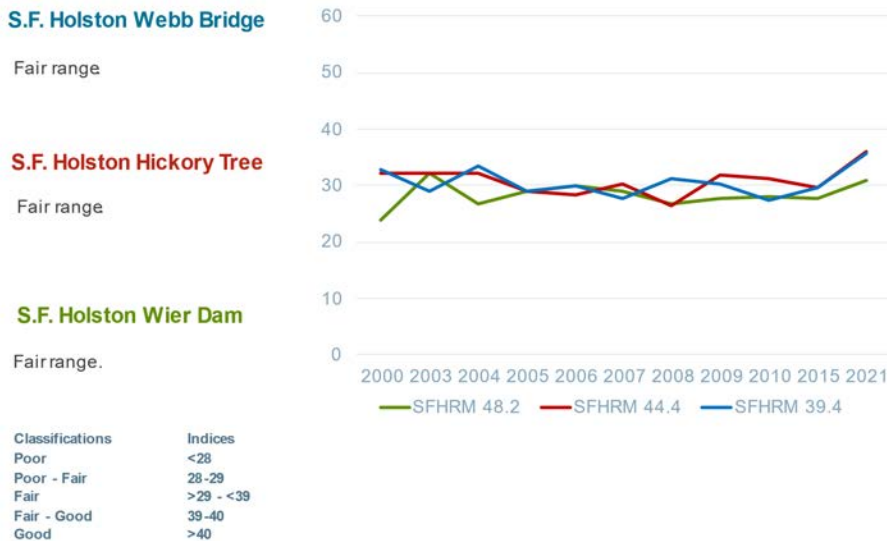
Webb Bridge SfHRM 39.4



PLACE THE TITLE OF THE PRESENTATION HERE



## South Holston Tailwater Benthic BIBI Score Trends



PLACE THE TITLE OF THE PRESENTATION HERE<sup>9</sup>



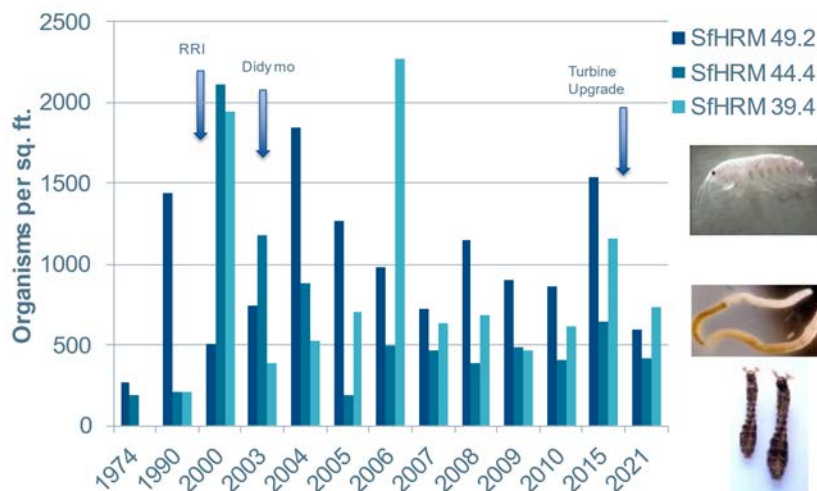
Classification of average B-IBI Scores is in the poor-fair to fair range.

BIBI index scores range from 28.8 to 30.8.

No statistically significant trend was detected.



## South Holston Tailwater Relative Abundance



PLACE THE TITLE OF THE PRESENTATION HERE<sup>10</sup>



Relative abundance, total number of organisms per sq. ft.

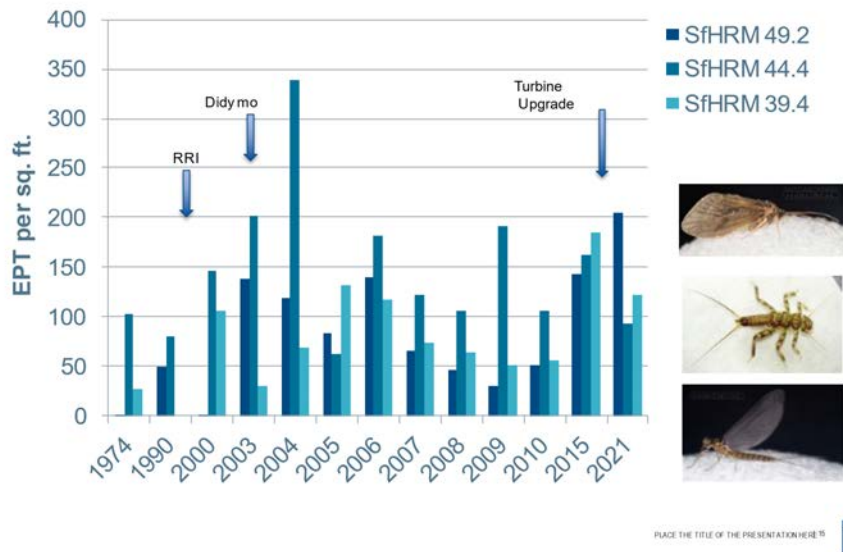
No statistically significant trend was detected.

Relative abundance increased immediately after Reservoir Release Improvements.

Turbine upgrade effects are negligible.



### South Holston Tailwater EPT Mayfly, Stonefly, Caddisfly



EPT is a count of (Ephemoptera, Plecoptera, Trichoptera) Mayflies Stoneflies and Caddisflies total number of organisms per sq. ft.

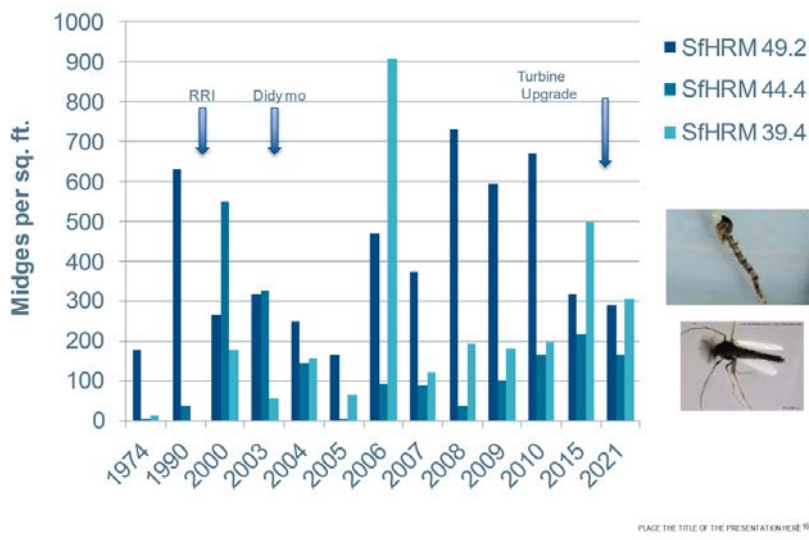
No statistically significant trend was detected.

EPT increased immediately after Reservoir Release Improvements.

Turbine upgrade effects are negligible.



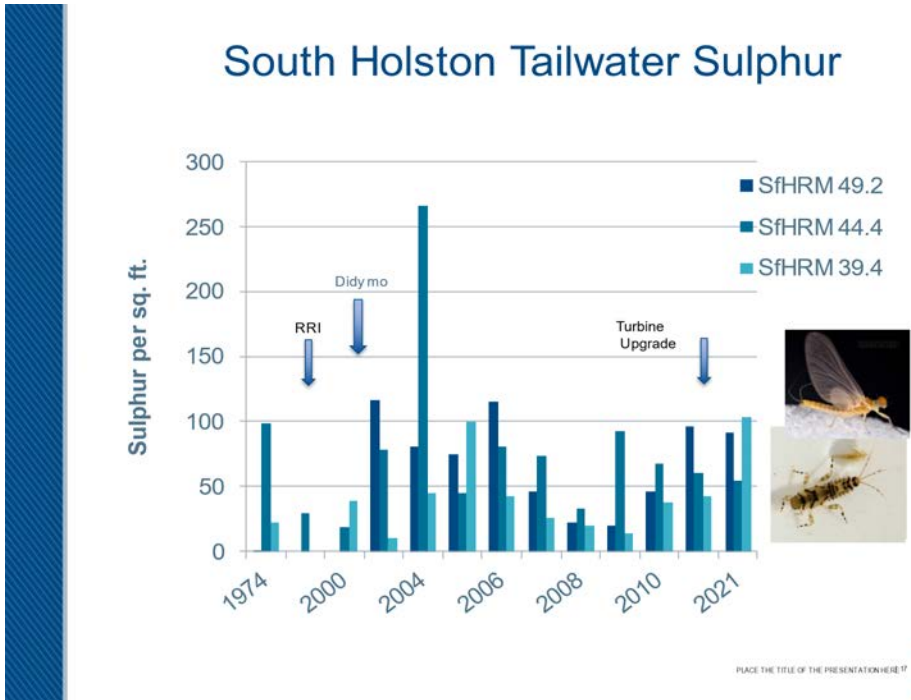
### South Holston Tailwater Midges



Midges is a count of total number of organisms per sq. ft.

No statistically significant trend was detected.

EPT increased immediately after Reservoir Release Improvements.  
 Turbine upgrade effects are negligible.

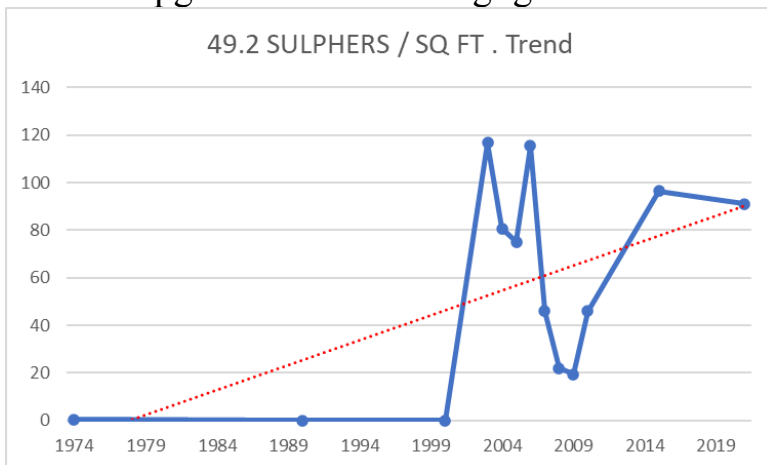


Sulphur mayflies is a count of total number of organisms per sq. ft.

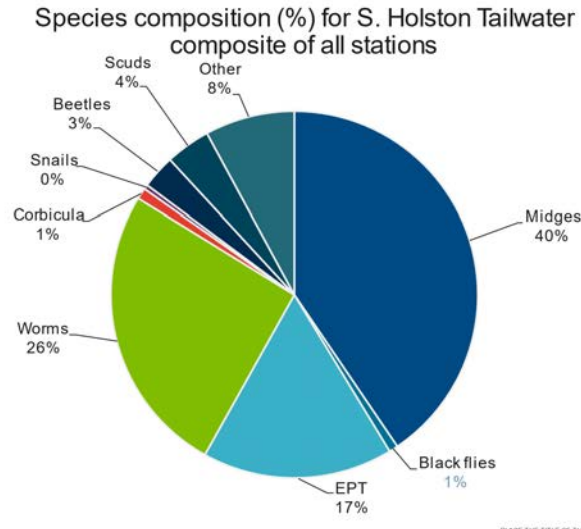
A statistically significant positive trend was detected. at SfHRM 49.2

Sulphur mayfly organisms per sq. ft. increased immediately after Reservoir Release Improvements.

Turbine upgrade effects are negligible.



## South Holston Benthic Species Composition



PLACE THE TITLE OF THE PRESENTATION HERE!! 

Most recent species composition, 2021 sample.

## Watauga Tailwater Monitoring Locations

Siam Bridge (31.0)

Elizabethton (21.8)

Saylor Island (16.4)



PLACE THE TITLE OF THE PRESENTATION HERE!! 

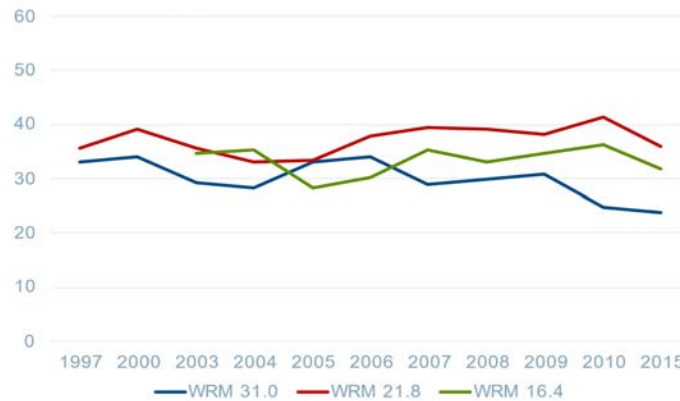


# Watauga Tailwater Benthic BIBI Score Trends

**Siam Bridge WRM 31.0**  
Poorto Fair range.

**Elizabethton WRM 21.8**  
Fairto Good range.

**Saylor Island WRM 16.4**  
Poor/Fair to Fair/Goodrange.



Classifications	Indices
Poor	<28
Poor - Fair	28 -29
Fair	>29 - <39
Fair - Good	39 -40
Good	>40

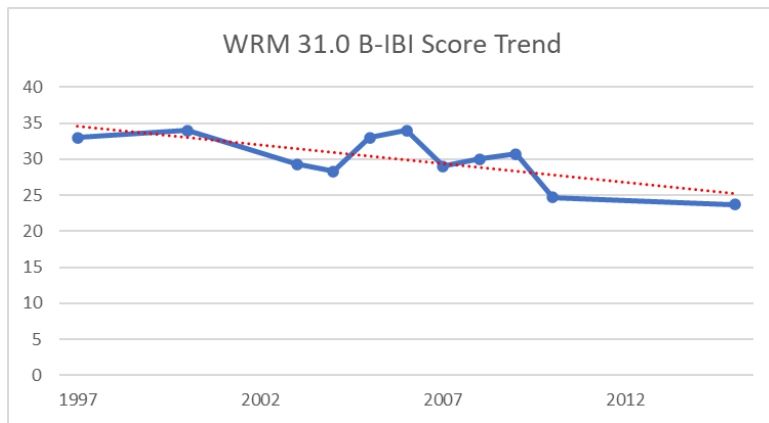
PLACE THE TITLE OF THE PRESENTATION HERE 12



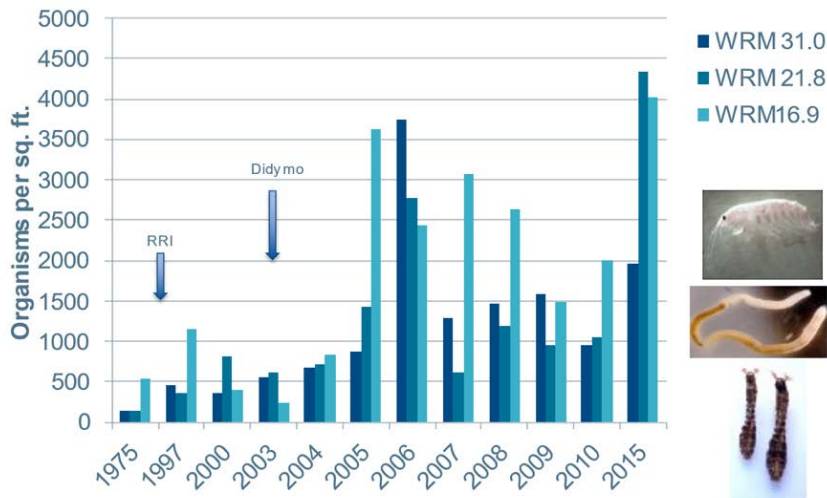
Classification of average BIBI Scores are in the poor to good range.

BIBI index scores range from 23.7 to 41.3.

A statistically significant negative score trend has been detected at WRM 31.0.



## Watauga Tailwater Relative Abundance

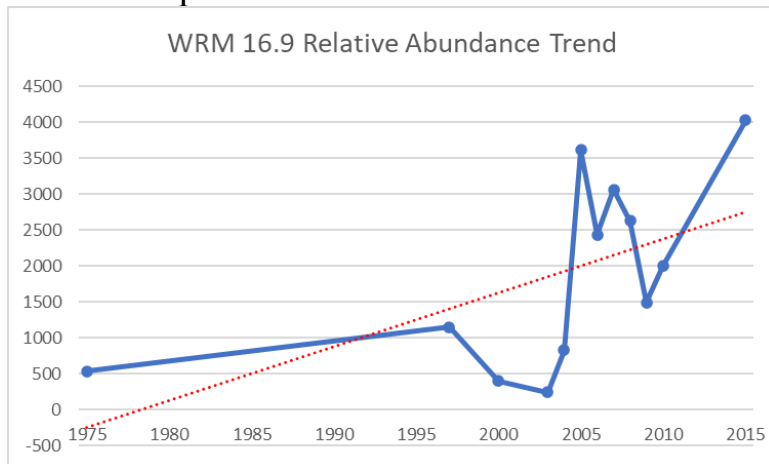


PLACE THE TITLE OF THE PRESENTATION HERE: 22



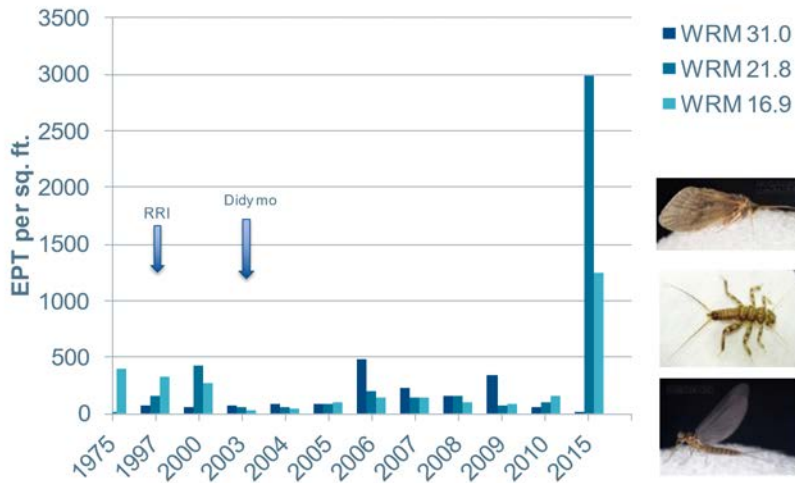
Relative abundance, total number of organisms per sq. ft.  
 A statistically significant positive density trend was detected at  
 WRM 16.9

Relative abundance increased immediately after Reservoir  
 Release Improvements.





## Watauga Tailwater EPT Mayfly, Stonefly, Caddisfly



PLACE THE TITLE OF THE PRESENTATION HERE 23

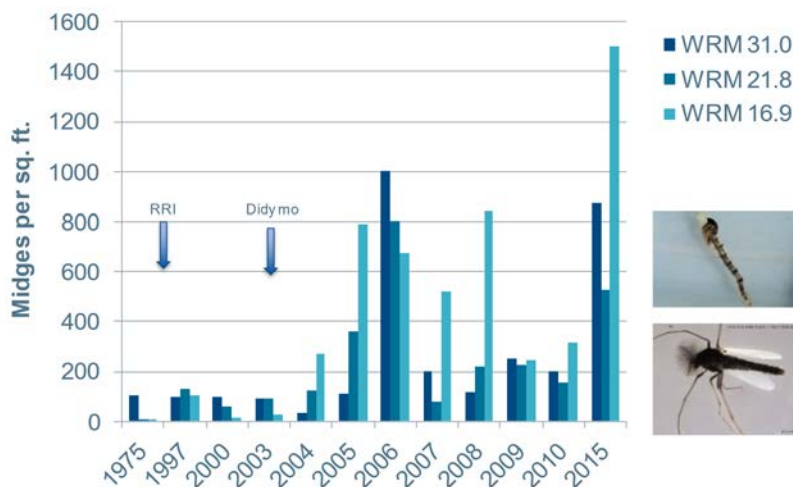


EPT is a count of (Ephemeroptera, Plecoptera, Trichoptera) Mayflies Stoneflies and Caddisflies total number of organisms per sq. ft.

No statistically significant trend was detected.

EPT increased immediately after Reservoir Release Improvements.

## Watauga Tailwater Midges



PLACE THE TITLE OF THE PRESENTATION HERE 24

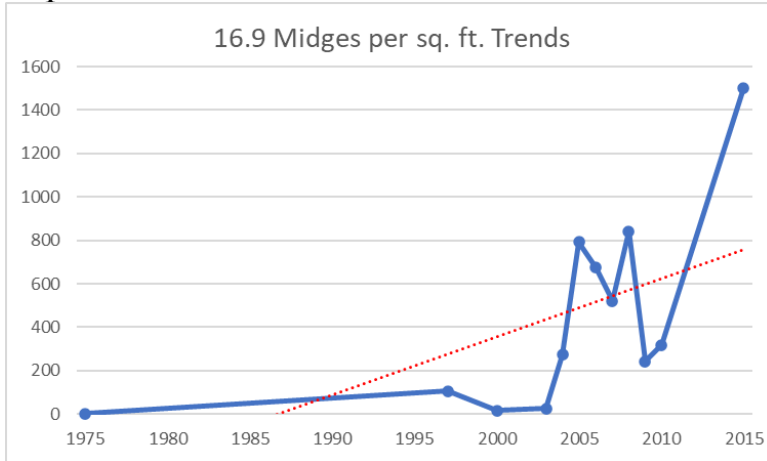


Midges is a count of total number of organisms per sq. ft.

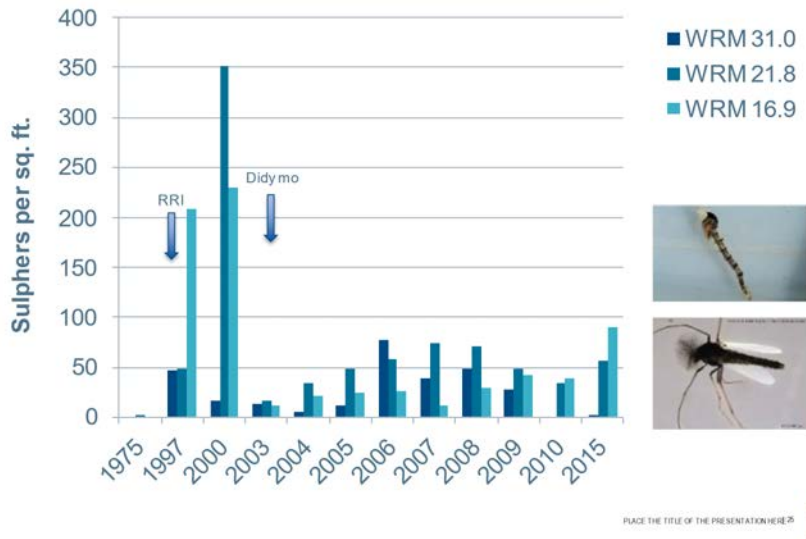
A statistically significant positive density trend was detected at WRM 16.9

Midges increased after Reservoir Release Improvements. This

increase could be attributed to point or nonpoint source impairment in the form of nutrient enrichment.



### Watauga Tailwater Sulphurs

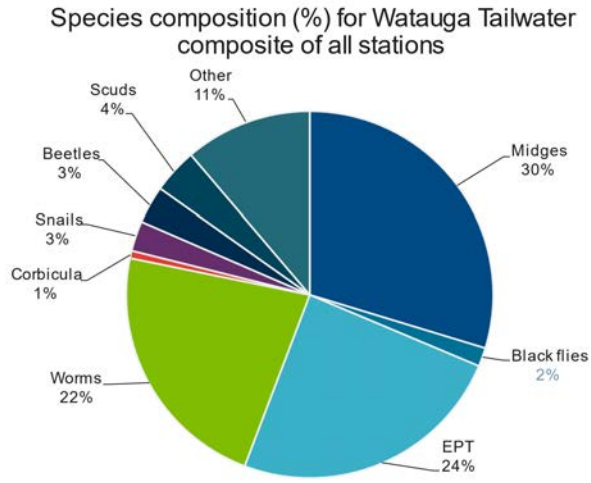


Sulphur mayflies is a count of total number of organisms per sq. ft.

No statistically significant trend was detected.

Sulphur mayfly organisms per sq. ft. increased immediately after Reservoir Release Improvements.

# Watauga Benthic Species Composition



PLACE THE TITLE OF THE PRESENTATION HERE !!!



Most recent species composition, 2015 sample.