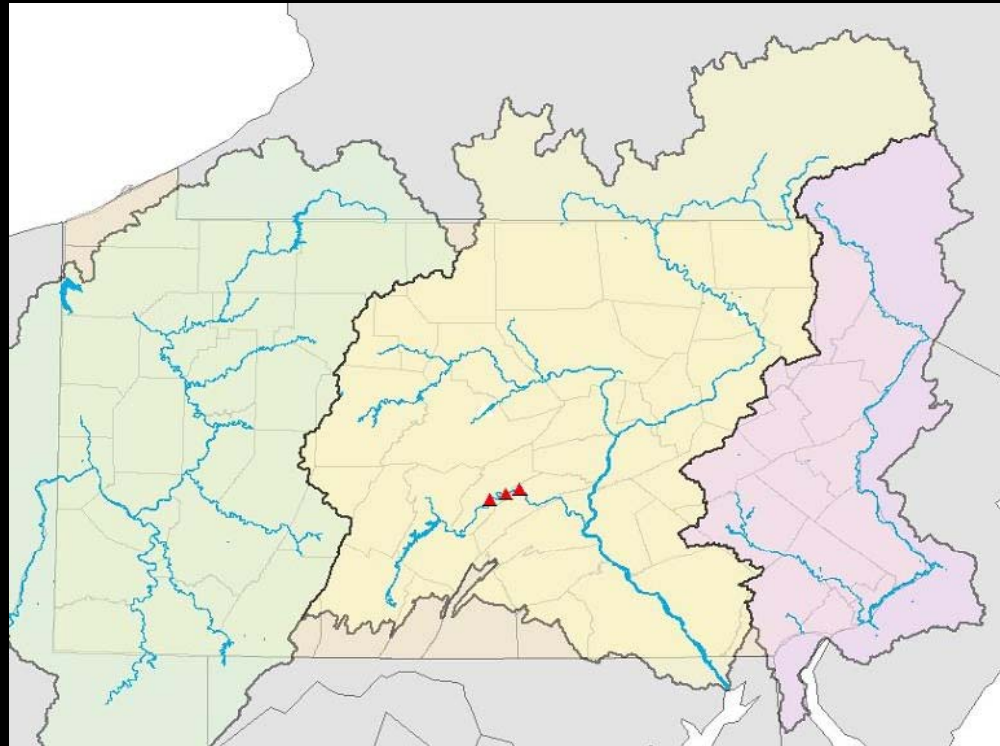


Susquehanna River Drainage YOY Smallmouth Bass Disease Investigations 2005 and 2007



July 2005 Fish Specimen Collection Sites

Juniata River
Mifflintown access
Narrows
Granville

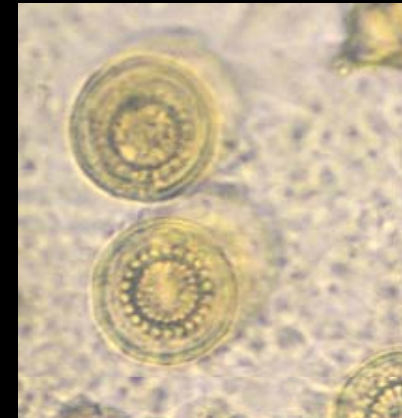
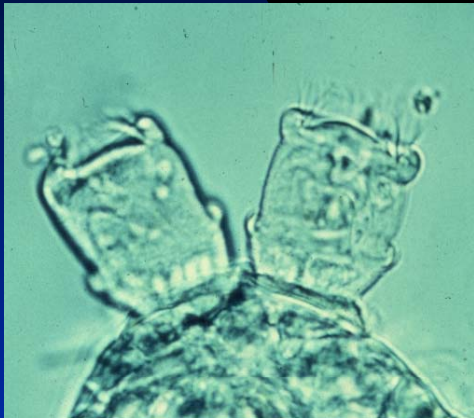


External Lesions

- **Fungi**
- **Motile aeromonads**
- **Pseudomonads**
- **Flavobacteria**



Parasites on the Skin



- *Schyphidia*
- *Glossatella*
- *Trichodina*

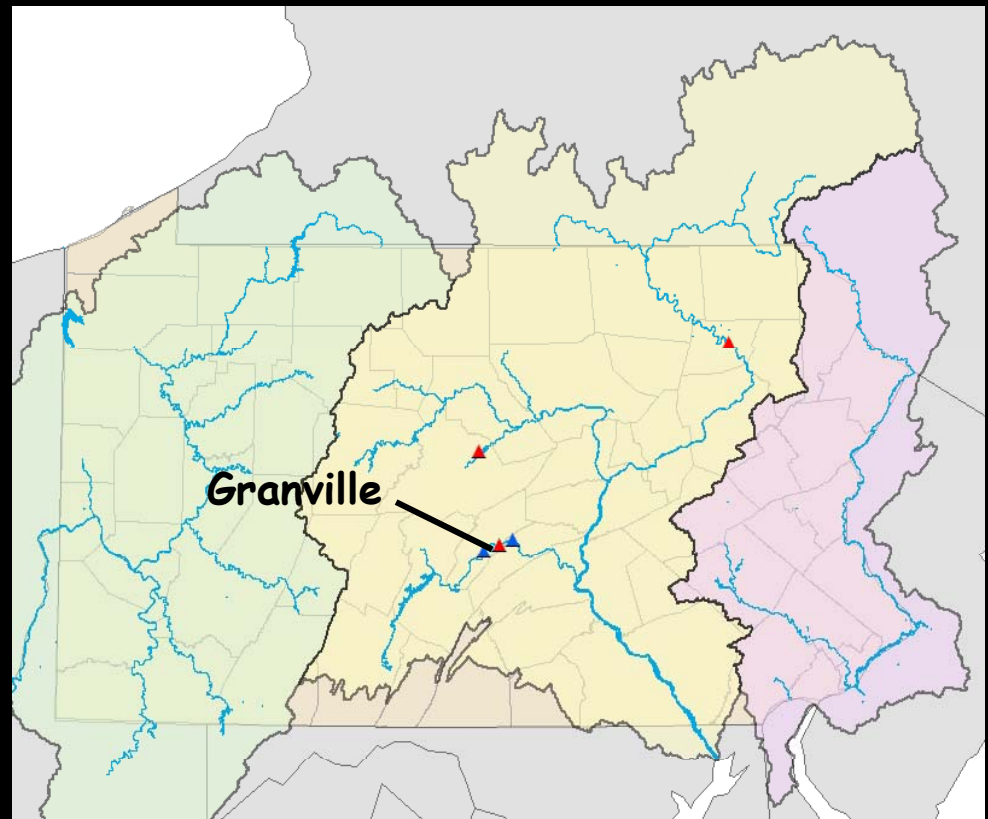
Kidney Tissue Assay

Flavobacterium columnare isolated



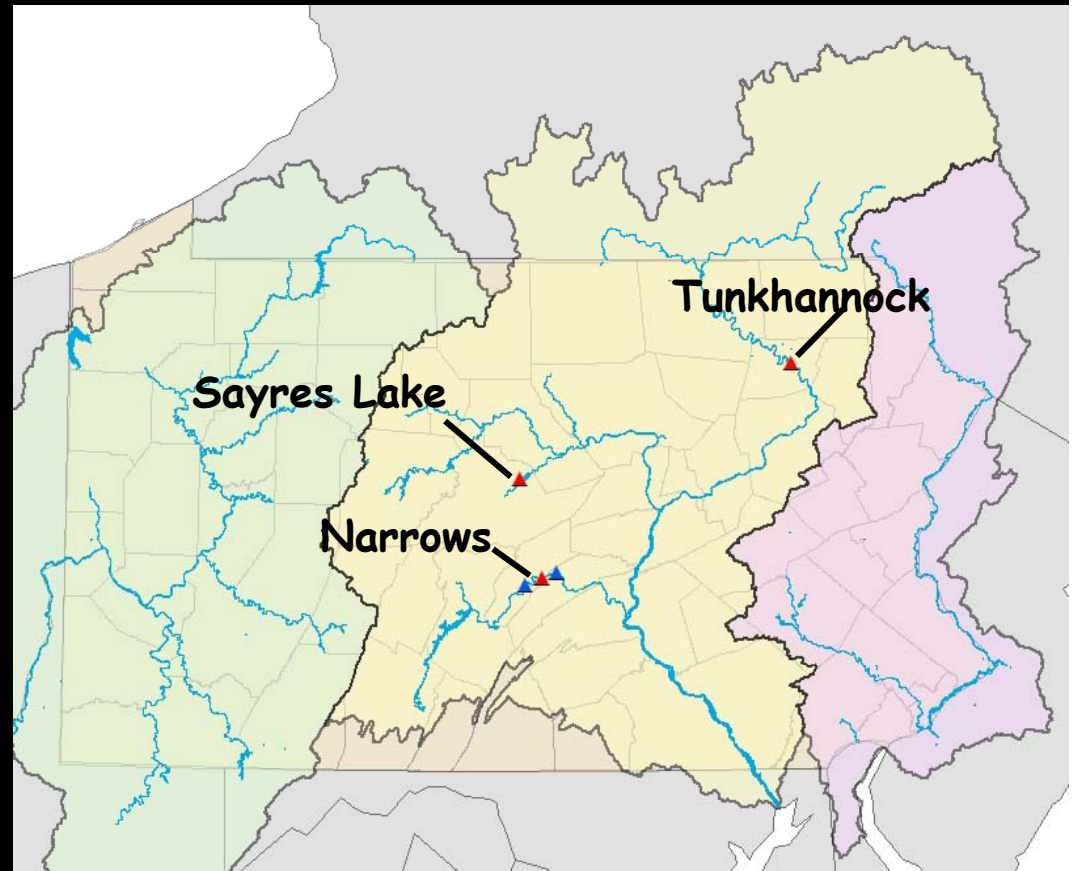
Granville Site

- Random electrofishing sample
- Fifty YOY SMB
- 56% - skin lesions
- 26% - severe skin lesions
- 2% - gill columnaris
- 50% - systemic *F. columnare* infection



Viral Assay Results

- Largemouth Bass virus detected in SMB from the Juniata River Narrows
- First detection of LMBv in fish from PA waters
- Later in 2005 LMBv was detected in SMB from the Susquehanna River and LMB from Sayres Lake
- LMBv was not detected in SMB from the Delaware and Allegheny Rivers



External Lesions

2005



2007



2007 Sample Sites

Susquehanna River

Danville

Shady Nook

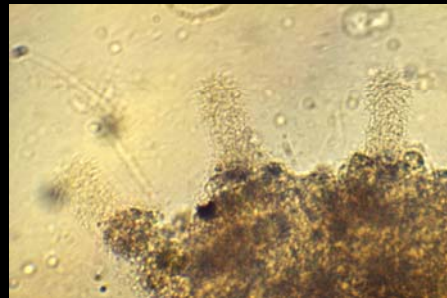
Montgomery

Juniata River

Granville

Pathogens Detected

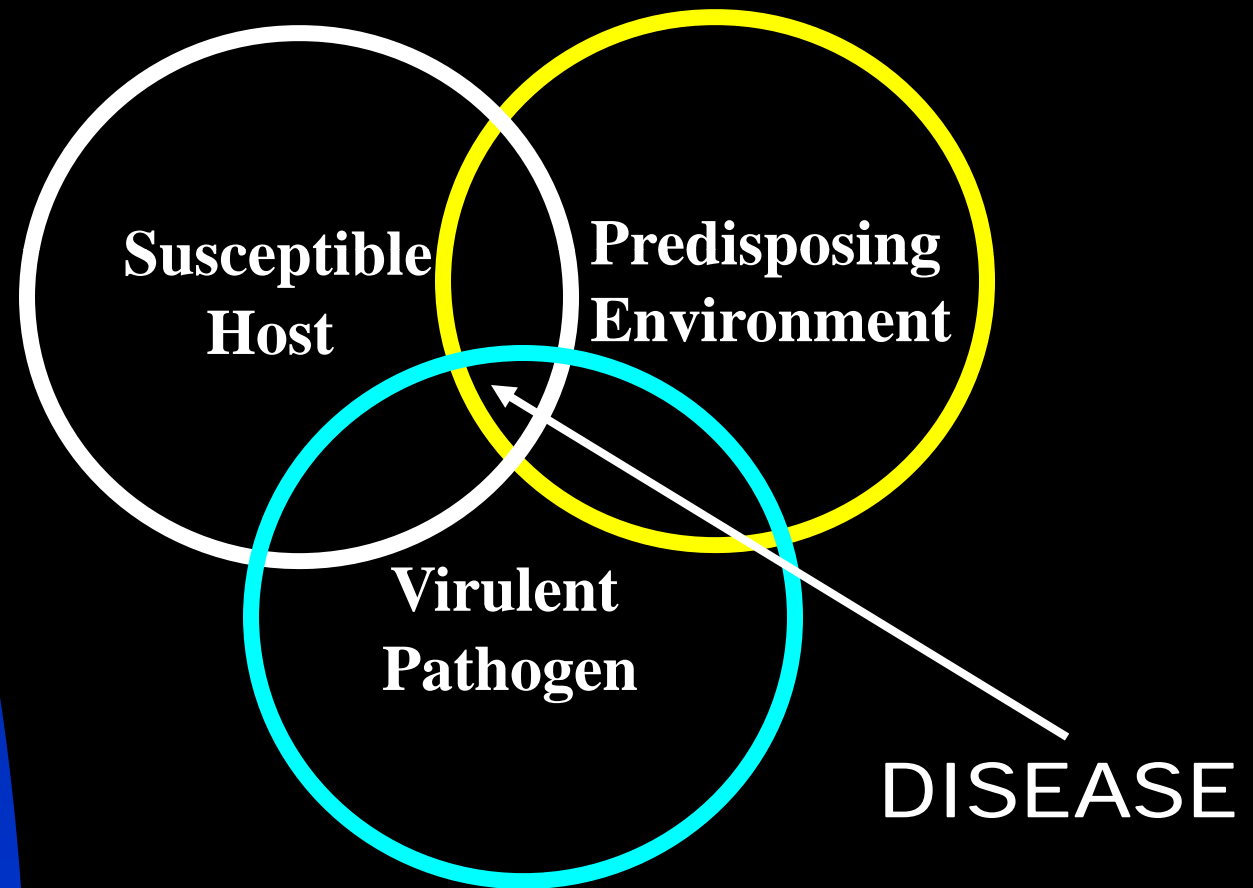
- **Fungi**
- **Internal and External parasites**
- **Columnaris**
 - ◆ **Gills**
 - ◆ **Skin**
 - ◆ **Kidney**
- **Motile aeromonads**
- **Largemouth bass virus**



Granville Site

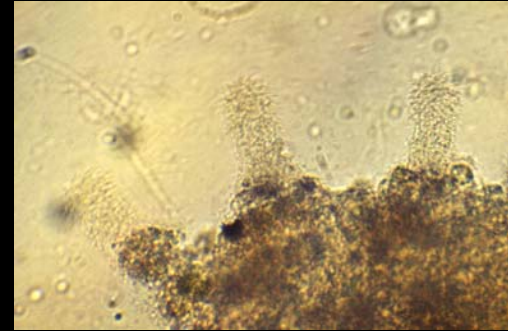
	<u>2005</u>	<u>2007</u>
Random Sample:	Yes	Yes
Number of YOY SMB:	50	18
Skin Lesions:	56%	67%
Severe Skin Lesions:	26%	33%
Gill Columnaris:	2%	7%
Systemic <i>F. columnare</i> infection:	50%	7%

Why Do Fish Diseases Occur?



Columnaris

- Bacterial infection caused by *Flavobacterium columnare*
- A common soil and water bacteria
- All freshwater fish species are susceptible
- Above 56° F can cause significant mortality
- An opportunistic pathogen
- The disease is associated with damage to the skin or gills, nutritional deficiencies, spawning stress and environmental stressors



Predisposing Environmental Factors

- Above 56 °F significant columnaris epizootics can occur
- The optimum growth temperatures for *F. columnare* are 82 to 86 °F
- July 20 – August 5, 2005 pre- and post-dawn water temperatures were approximately 81 °F

Predisposing Environmental Factors

- For warmwater fish species, growth is inhibited at dissolved oxygen levels of 1 to 5 mg/l
- July 20 to August 5, 2005 pre- and post-dawn dissolved oxygen levels varied from 3.1 to 6.3 mg/l

Largemouth Bass Virus and the Juniata River Smallmouth Bass Mortality

- No documented cases of the virus causing mortality in species other than largemouth bass
- LMBv causes mortality only in adult largemouth bass
- Carrier infections in guppies, smallmouth and spotted bass, white and black crappie, Suwanee bass, bluegill and redbreasted sunfish
- LMBv does not cause external lesions
- In 2005, the LMBv titers in adult largemouth bass from Sayre Lake were as much as 100,000 x higher
- The 2007 preliminary histology assay data indicate that the observed tissue changes do not resemble those associated with LMBV



Additional LMBV Sampling in 2007

<u>Site</u>	<u>Sampling Completed</u>	<u>Viral Assay Results</u>
Allegheny River – Tionesta	Sept 10	Pending
Lower Allegheny River	Pending	N.A.
Delaware River – Matamoras	Sept 5	Pending
Delaware River – Kitnersville	Aug 29	Pending
Susquehanna River – Laceyville	Aug 29	Pending

Susquehanna River Drainage YOY Smallmouth Bass 2005 & 2007 Disease Investigation Summary

- Low level internal and external parasite infestations
- Low level fungal and LMBv infections
- **Environmental Conditions**
 - high water temperatures
 - low dissolved oxygen
 - low water flows
 - other stress factors
- External and systemic columnaris



