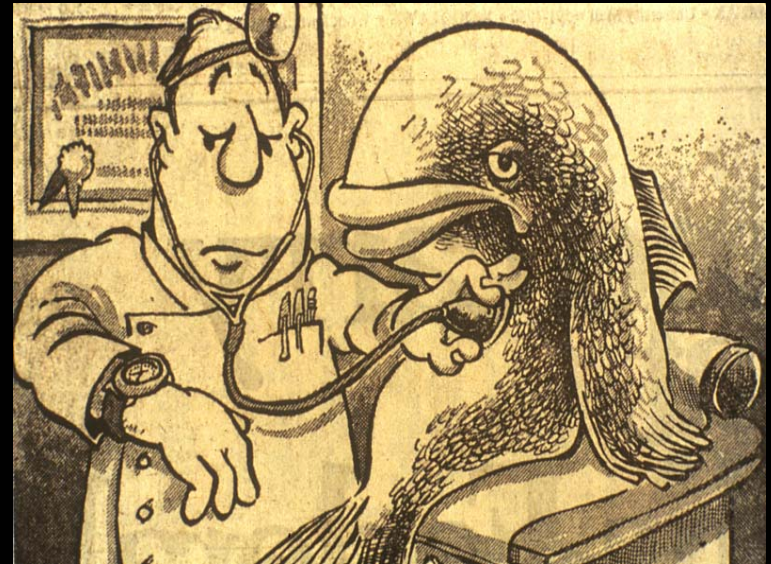


Juniata River
Smallmouth Bass
Young of the Year Mortality
July 2005



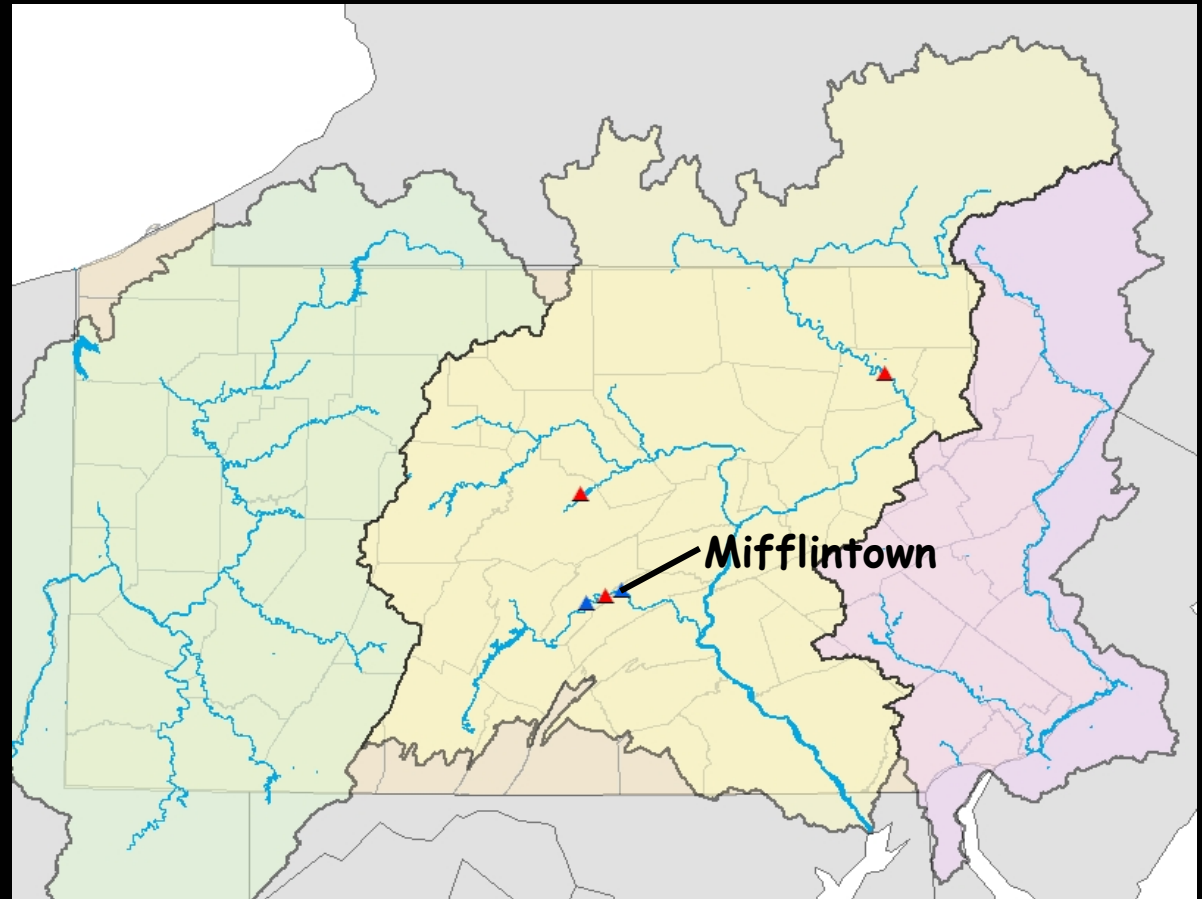
Fish Specimen Collection Dates

- July 7 – Mifflintown access
- July 11 – Narrows
- July 15 – Granville



July 7 Mifflintown Access Site

- YOY SMB
- Electrofishing
- External lesions
- Refrigerated
- Examined on July 8

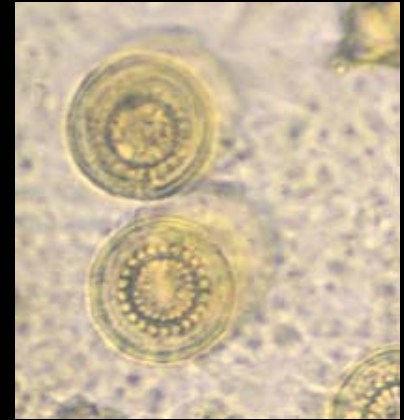


External Lesions

- **Fungii**
- **Motile aeromonads**
- **Pseudomonads**
- **Flavobacteria**



Parasites on the Skin



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

Examination of the Gills

- Gill tissues structure too deteriorated to evaluate
- Very light *Glossatella* infestation
- No Flavobacteria observed



Kidney Tissue Assay

Flavobacterium columnare isolated
from 3 of 6 fish sampled



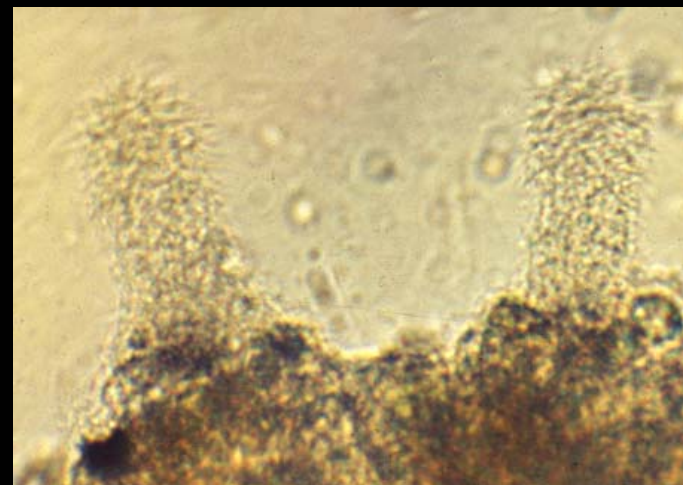
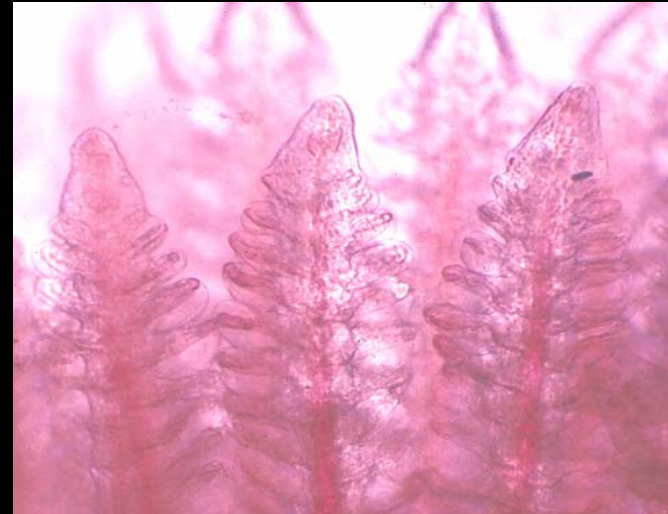
July 11 - Narrows Site

- YOY SMB
- Electrofishing
- Lesions present
- Two struggling, near death specimens collected by hand
- Specimens iced and examined on the day of collection



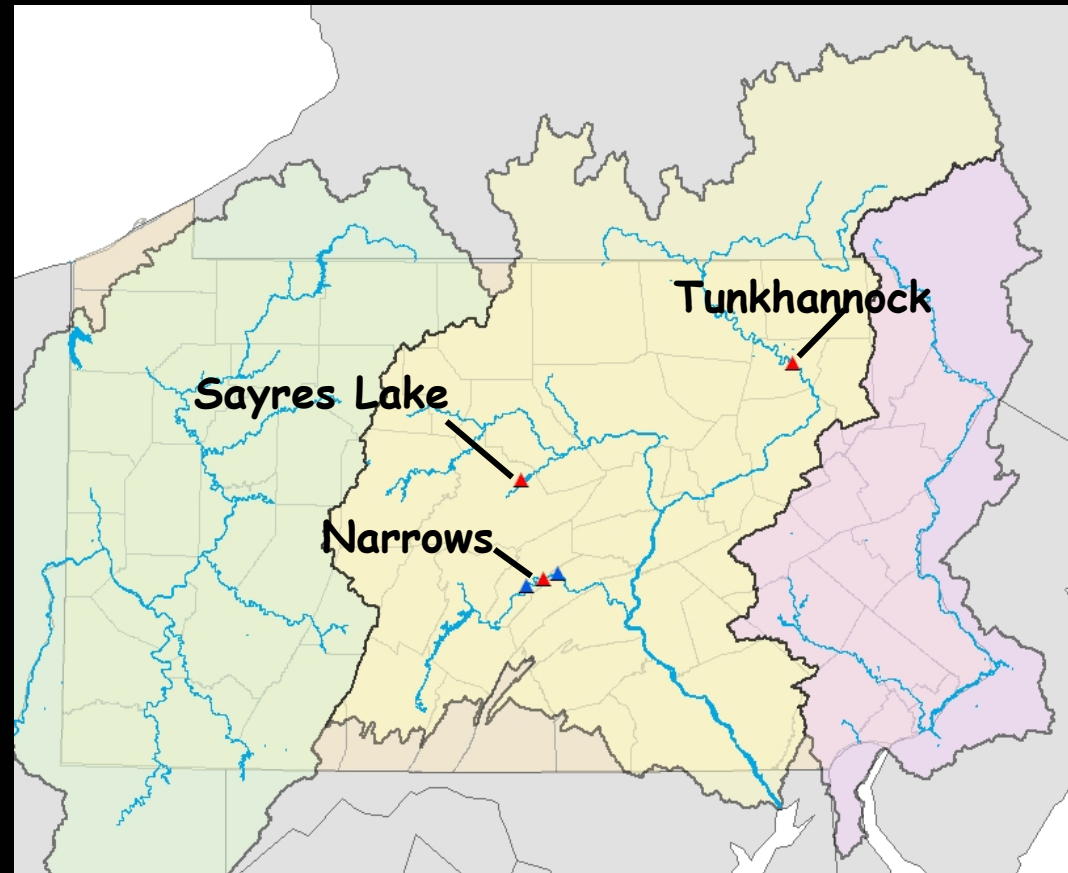
Near Death Specimens

- Gill structure normal
- Light *Glossatella* and *Trichodina* infestations
- Very light fungal infection
- Heavy *F. columnare* infection
 - ◆ skin
 - ◆ lesions
 - ◆ isolated from the kidneys



Viral Assay Results

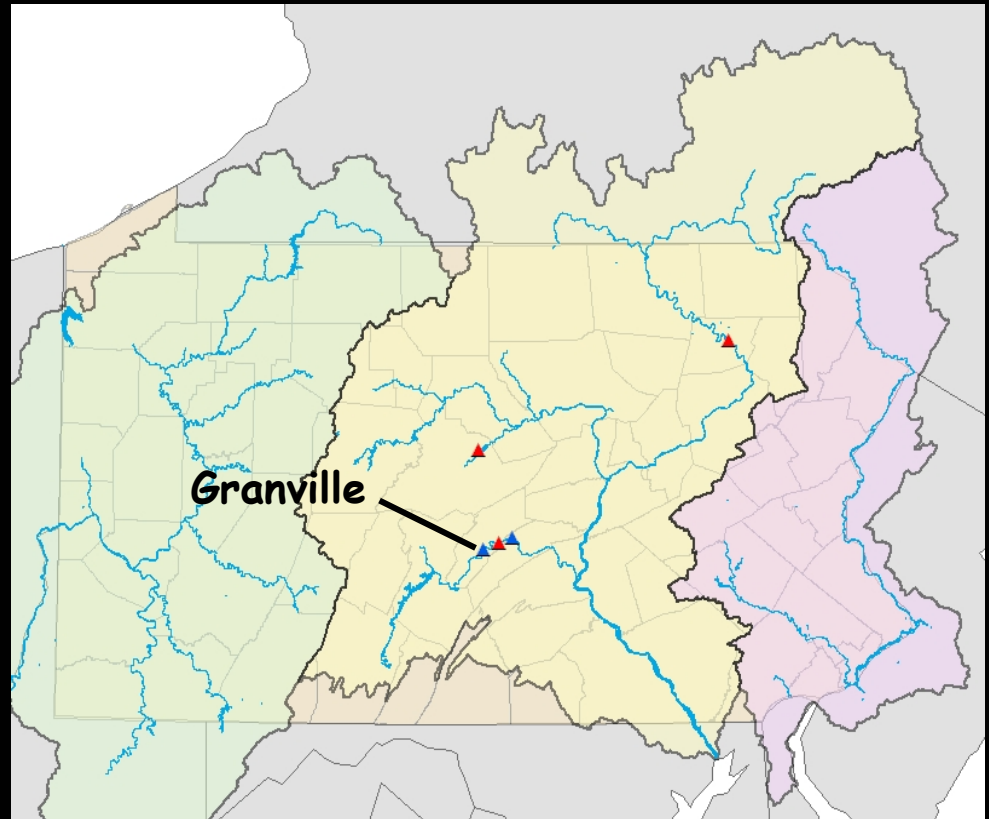
- Tissue samples from the Narrows SMB collected by electrofishing
- U.S. F. W. S. Lamar Fish Health Laboratory - National Wild Fish Health Survey
- Largemouth Bass virus detected
- First detection of LMBv in fish from PA waters
- Later in 2005 LMBv was detected in SMB from the Susquehanna River and LMB from Sayres Lake



July 15 - Granville Site

- Random electrofishing sample
- Fifty YOY SMB
- Ice and examined on the same day

- 56% - skin lesions
- 26% - severe skin lesions
- 2% - gill columnaris
- 50% - systemic *F. columnare* infection



Columnaris

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



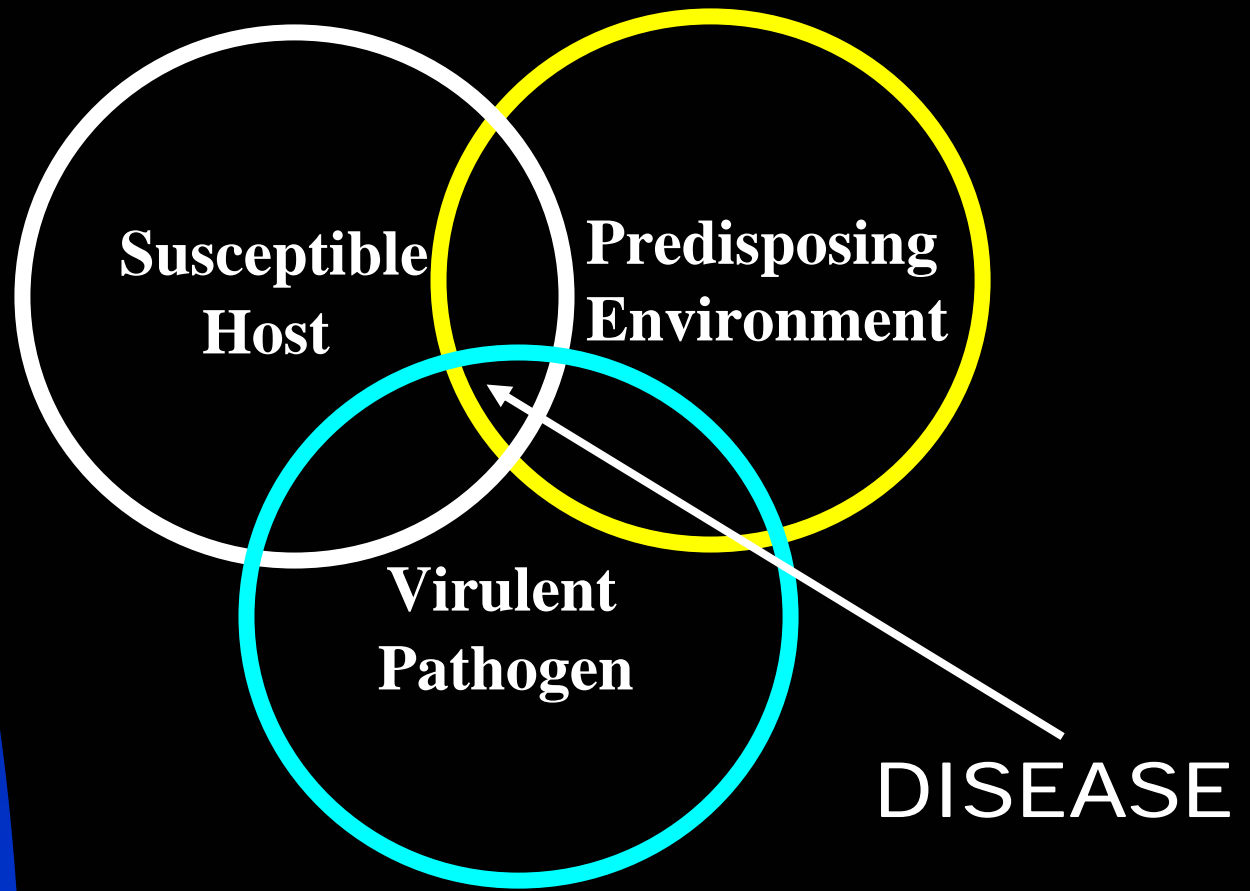
Why Do Fish Diseases Occur?

**Susceptible
Host**

**Predisposing
Environment**

**Virulent
Pathogen**

Why Do Fish Diseases Occur?



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 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 pre- and post-dawn dissolved oxygen levels varied from 3.1 to 6.3 mg/l

Predisposing Environmental Factors

- **Low water volume = pathogens more concentrated**
- **Low water velocity = longer exposure time to pathogens**

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
- The LMBv titers in adult largemouth bass from Sayre Lake were as much as 100,000 x higher



Juniata River Smallmouth Bass Mortality Summary

- Low level 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



Acknowledgements

- **PFBC Fisheries Management staff**
- **John Coll and the staff at the USFWS Lamar Fish Health Unit**
- **Dr. John Grizzle and the staff at the Auburn University Fish Disease Diagnostic Laboratory**

