



## Update on proposed PFBC and cooperator projects for 2013 regarding smallmouth bass disease

# Areas of focus

- Disease in YOY smallmouth bass
  - Bacterial infections
  - Parasites
  - Viral infection
- Water quality
- Recent concerns with adult smallmouth bass
  - Intersex
  - Melanosis
  - Papillomas



# Disease in YOY smallmouth bass

- PA SeaGrant Award
  - Distribution of Parasites
  - Role it plays in bacterial infections
  - Intermediate hosts

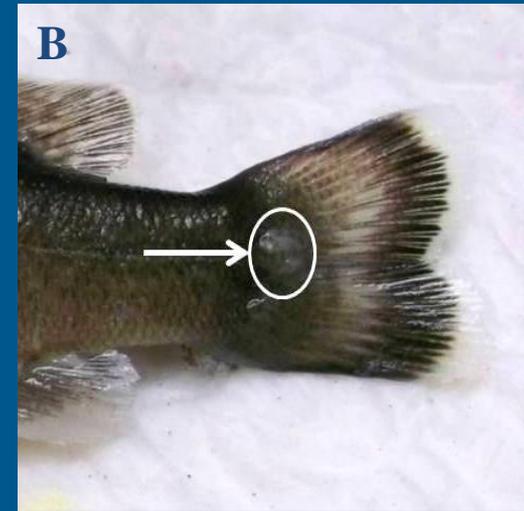


Photo: J. Cukjati - USGS PA Water Sci. Center

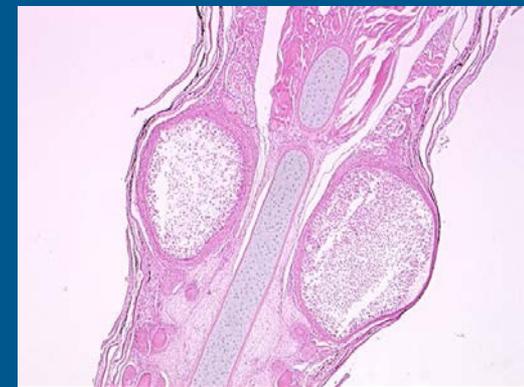


# Parasites

- Determine range of parasite infections in smallmouth bass
  - Limited to Susquehanna Basin?
- Is the wound the source of infection?
  - Or does parasite load cause stress
- What is the intermediate host?
  - Is there something about the host we can do something about?



from Walsh *et al.* 2012



# Disease in YOY smallmouth bass

- Largemouth Bass Virus (LMBV)
  - Distribution of LMBV
  - Is what we are seeing really LMBV?
    - Compare to historic LMBV fish kills
  - Role that LMBV could be playing in immune suppression.



Photo: J. Chaplin - USGS PA Water Sci. Center



# Largemouth Bass Virus (LMBV)

- Genetic variants explain differential mortality in bass species?
- Based on major capsid protein (MCP) sequencing this is unlikely
  - Partial MCP gene of 16 isolates sequenced
  - 100% identical across 500 bp
  - MCP is typically the most variable in this family of virus

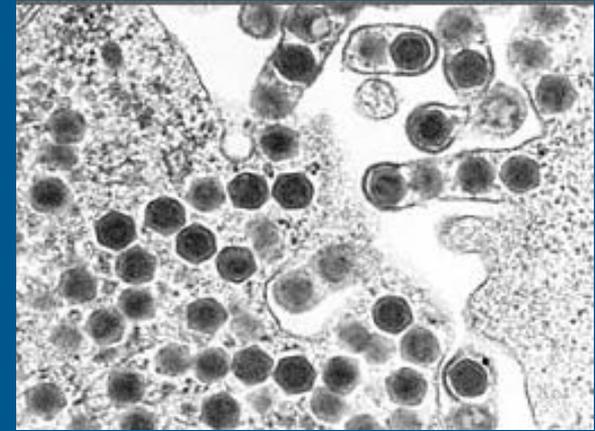


Photo: L. Iwanowicz – USGS NFHRL



# Largemouth Bass Virus (LMBV)

- Whole genome sequencing (genome ~ 120 kb)
  - Next Generation Sequencing (NGS) methods
  - Difference in genes associated with virulence could explain difference?
  - Data pending (issues with host cell contamination)



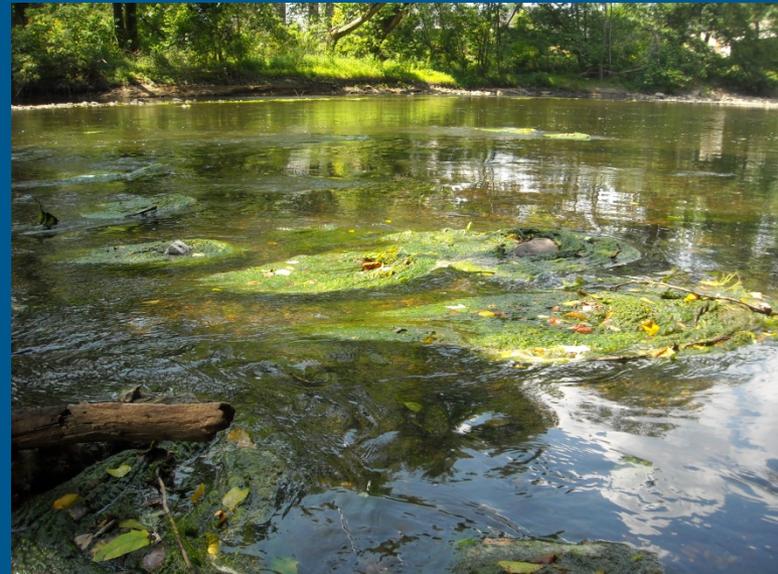
# Chesapeake Bay PES project

- Moving up Susquehanna River and Potomac River
  - Contaminants in bed sediment and water (periodic)
  - Different land uses
  - Pre-spawn adults, early YOY, and typical YOY collections



# Chesapeake Bay PES project

- Moving up Susquehanna River and Potomac River
  - Focusing on a few tributaries with differing land-use and disease prevalence
    - West Branch Mahantango Creek
    - Chillisquaque Creek
    - Loyalsock Creek
    - Wyalusing Creek



# Adult smallmouth bass

- Intersex
- Lesions
- Melanosis
- Papillomas



# Intersex

- Reproductive endocrine disruption
  - Frequent and severe cases of testicular oocytes
    - As high as 90-100%
  - High concentrations of vitellogenin in adult males

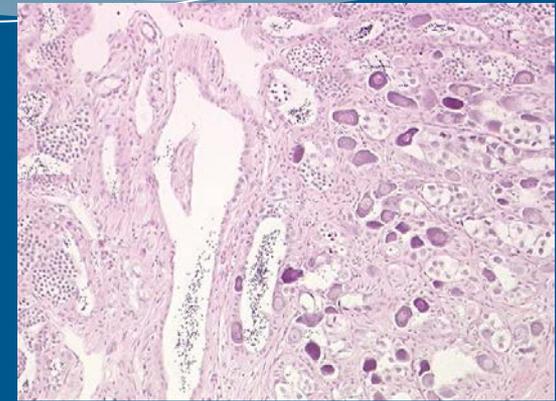


Photo: V. Blazer – USGS  
National Fish Health  
Research Lab



# Lesions on adult smallmouth bass

- Observed in Autumn 2012
- Isolated to small reach of river
- Approximately 40 – 50% of individuals
  - Covered 25 – 50% of body



*Angler provided photo*



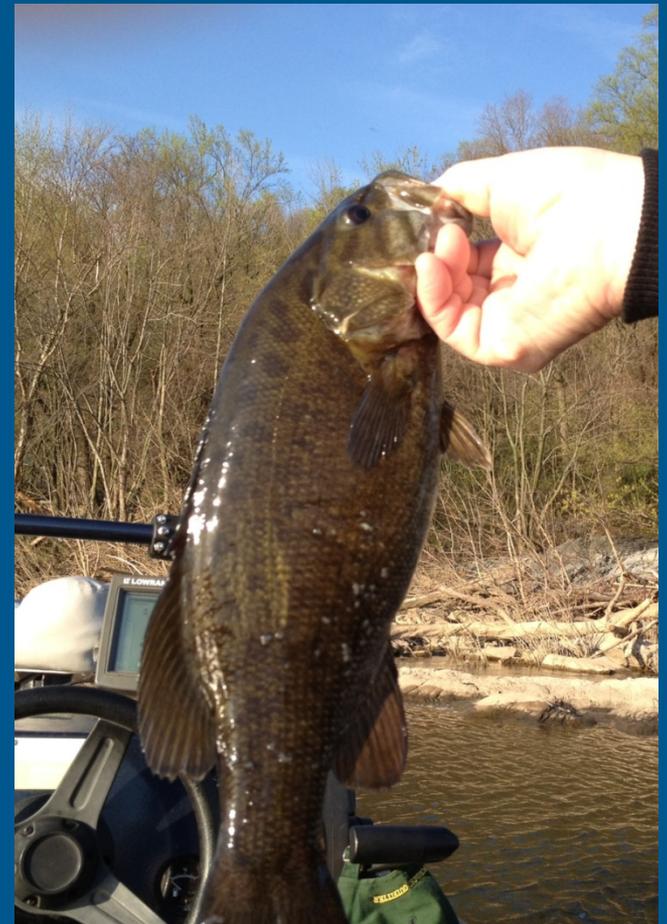
# Melanosis

- Submitted samples in April and again in October
- Keeping an eye on this
  - Relatively common
  - If increasing in frequency might be a signal of something else
- Looking to use other collections to support this
  - Tissue from pre-spawn fish
  - Contaminant measurements



# Papillomas

- Very low proportion of individuals
- Currently uncertain whether related to water quality or viral in origin
  - Submitted sample in October



*Angler provided photo*



# Summary

1. A number of different yet related studies
2. Looking at biological and chemical contributors to outbreaks
3. Looking at YOY smallmouth bass as well as what is going on with adults more recently



# Questions

