

Population Parameters & Variable Recruitment in Virginia Tidal River Blue Catfish Populations

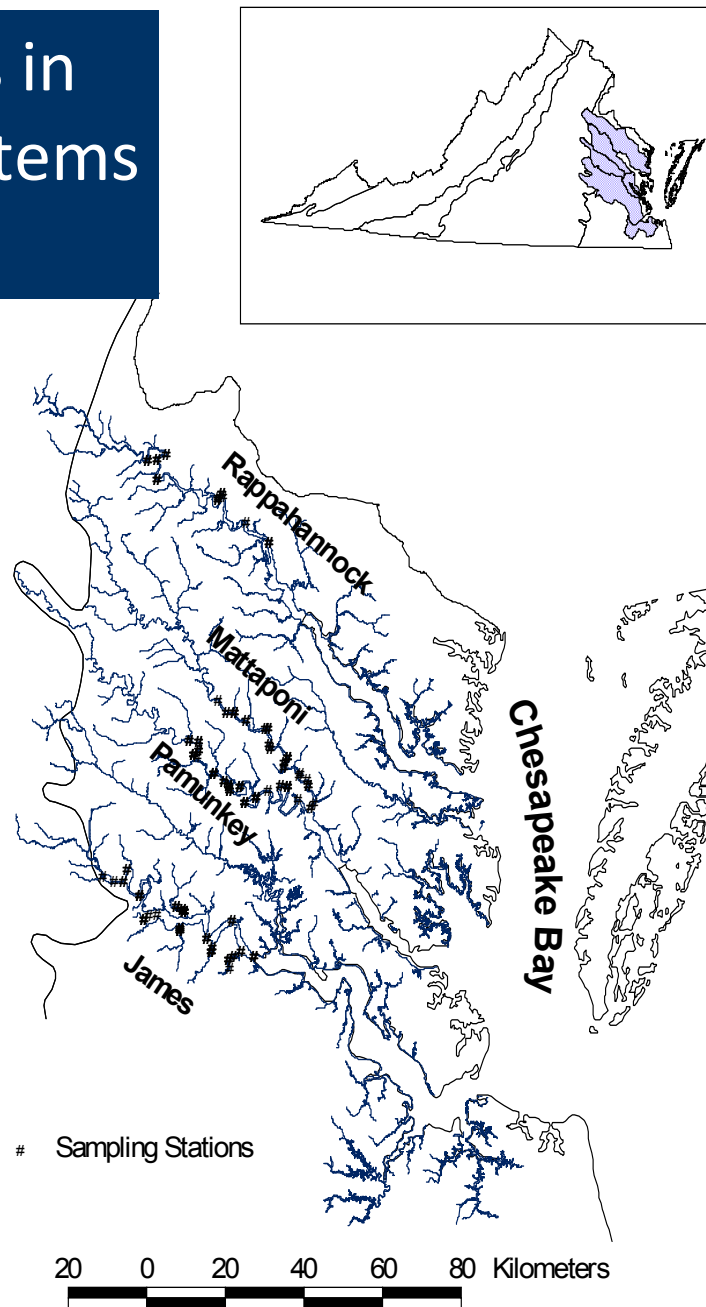
Bob Greenlee

(804) 829-6715

bob.greenlee@dgif.virginia.gov



Sampling Stations in Four Tidal River Systems 2001 - 2008



Sampling Strategy

2001 - 2008

- Summer Low Frequency (15 pps) Boat Electrofishing
 - Fixed station design
 - Not all rivers sampled each year, and not all stations sampled in each survey
 - Single run per station
 - standardized to 600 s per run after 2002
 - EF boat and Pick-up boat
 - Two netters on each boat
 - Extra netters to assist in landing of unusually large fish ($\sim > 20$ Kg)
- Otoliths Collected for Age & Growth beginning in 2002
 - 2002 – 2004 otolith subsampling based on N per cm-group
 - High variability in individual growth => age-length key of limited value
 - After 2004, random subsampling
 - Age and Growth analyses based on over 5,000 aged individuals



Capture Efficiency Low and Variable



Unbelievably Abundant

One of two tanks collected during 10 minutes of electrofishing on the Rappahannock River

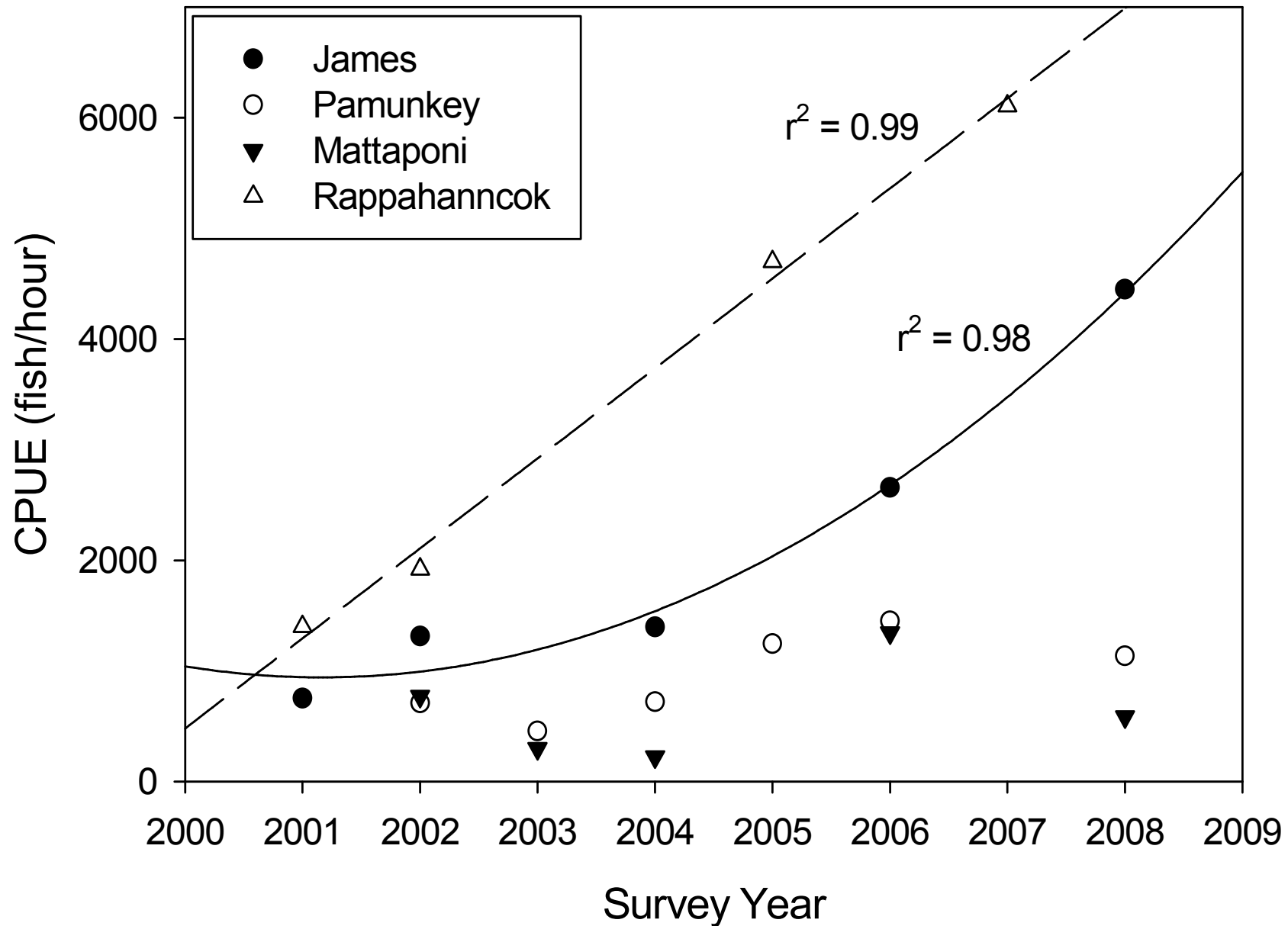


Dramatic Differences Among Rivers

Sample From Tributary of James

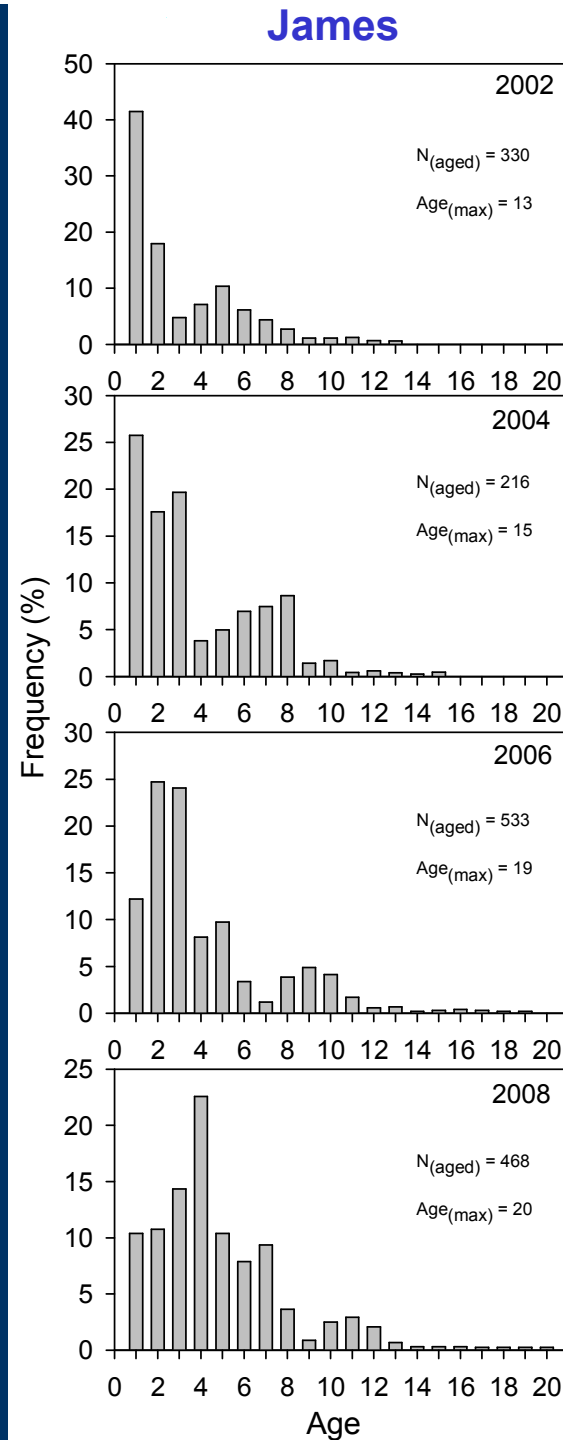


Increasing Catch Rates in James and Rappahannock



Increase in Upper Limit of Age Structure

James River System



Increase in Upper Limits of Age Structure York System

Age Distribution not as developed as James or Rappahannock

Mattaponi

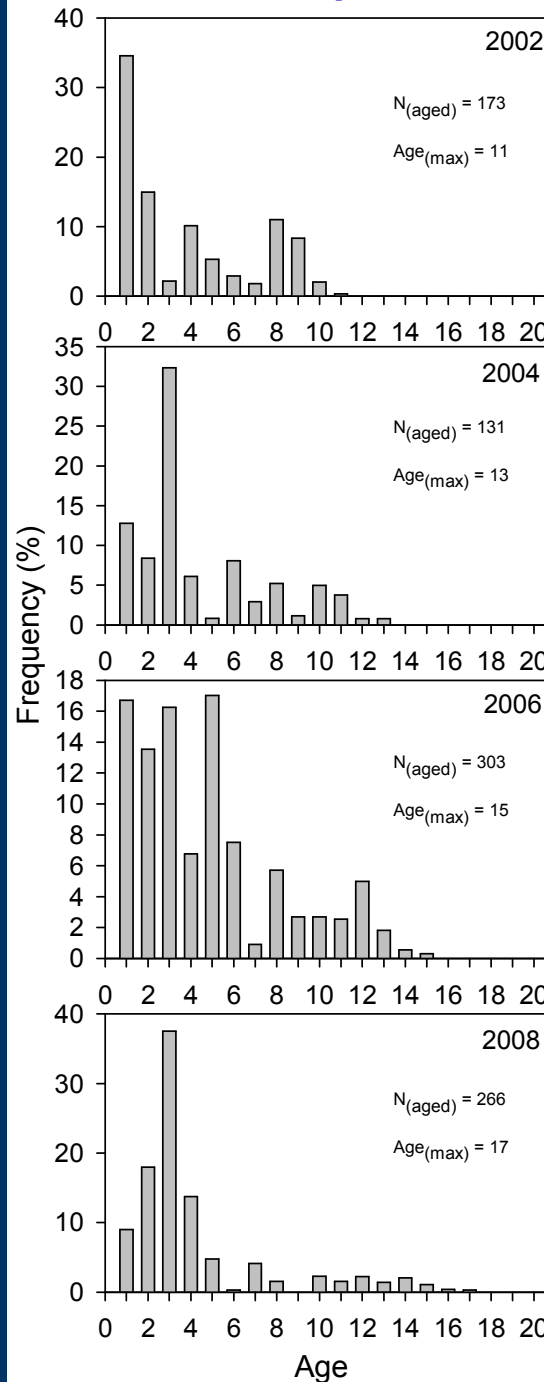
- 1991 YC defines upper limit

Pamunkey

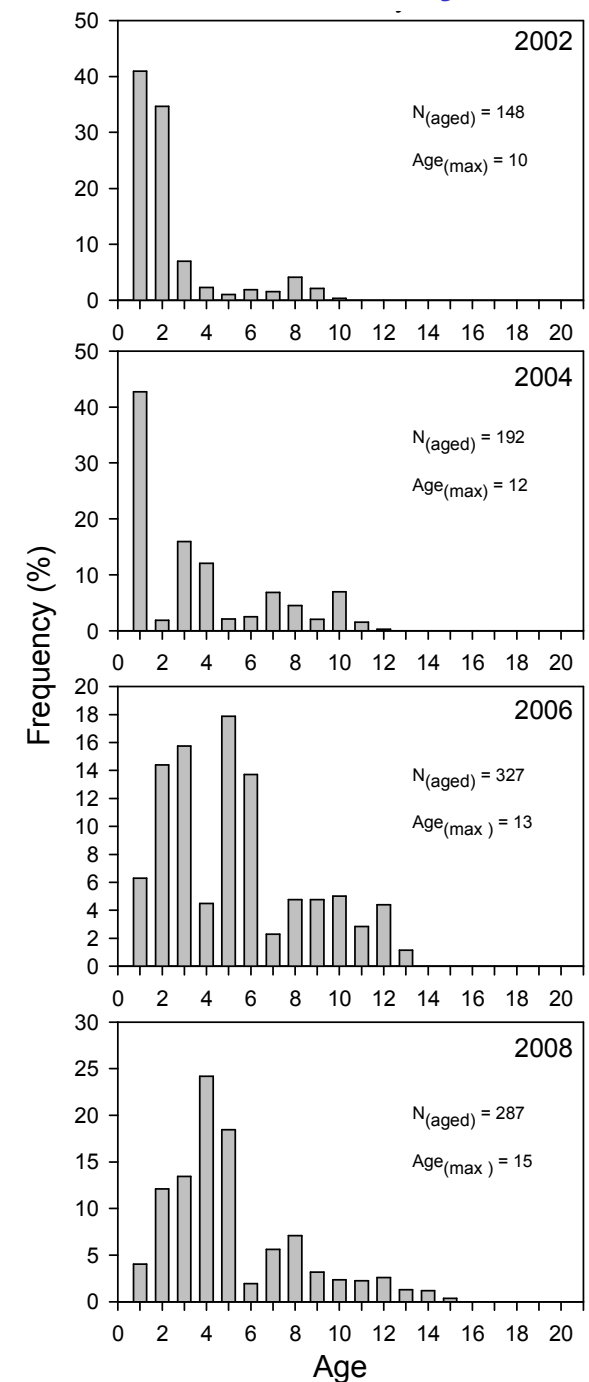
- 1991 or 1992 YC define upper limit



Mattaponi

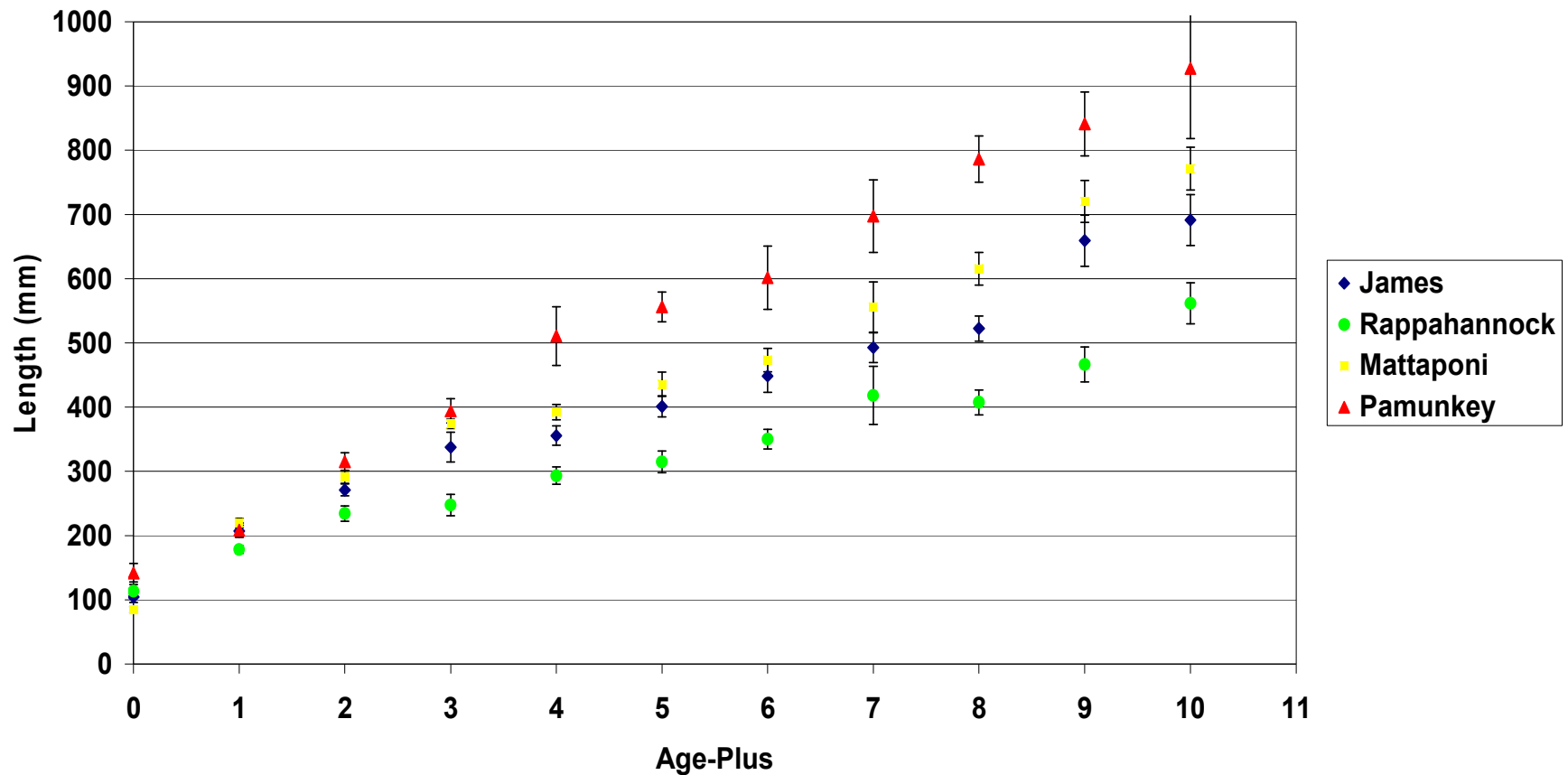


Pamunkey



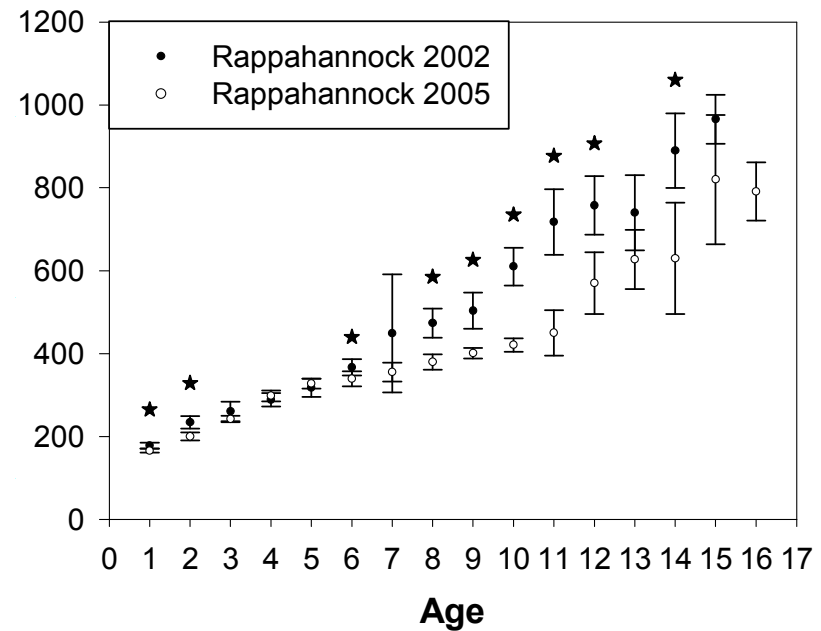
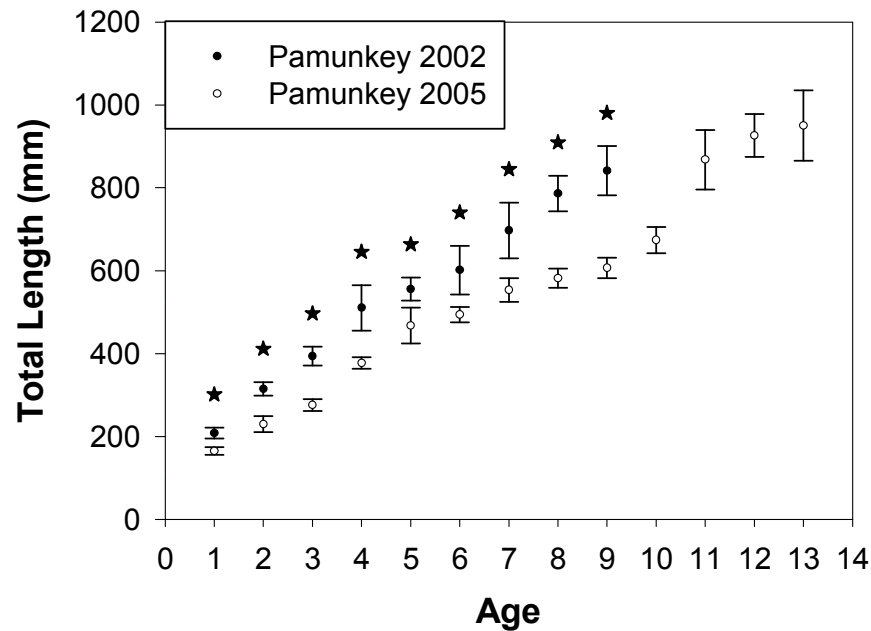
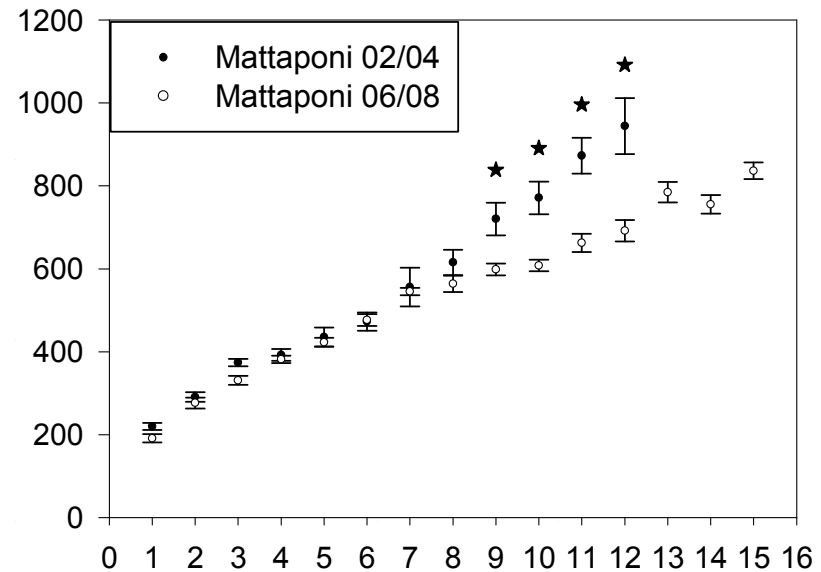
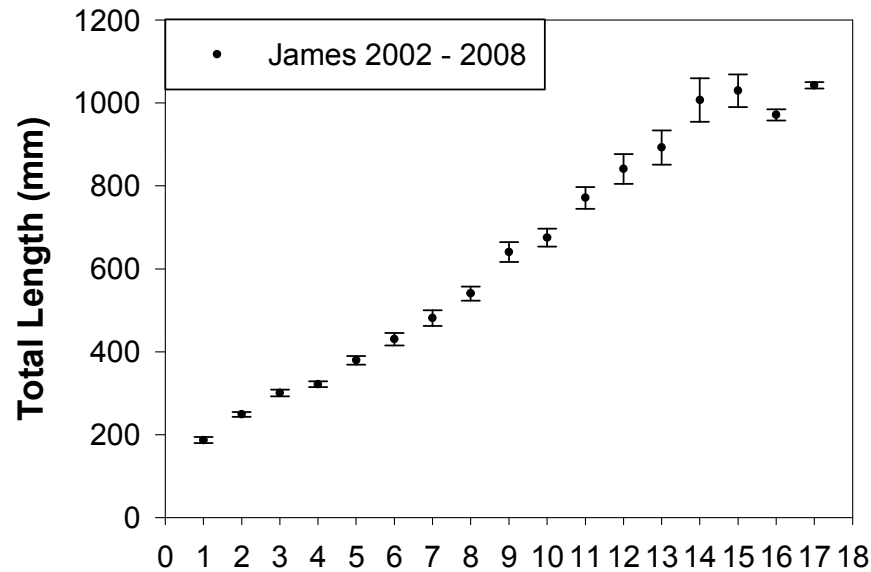
Growth Rates – Differences Among Rivers 2002

(mean total length-at-age w/ 95% Confidence Intervals)

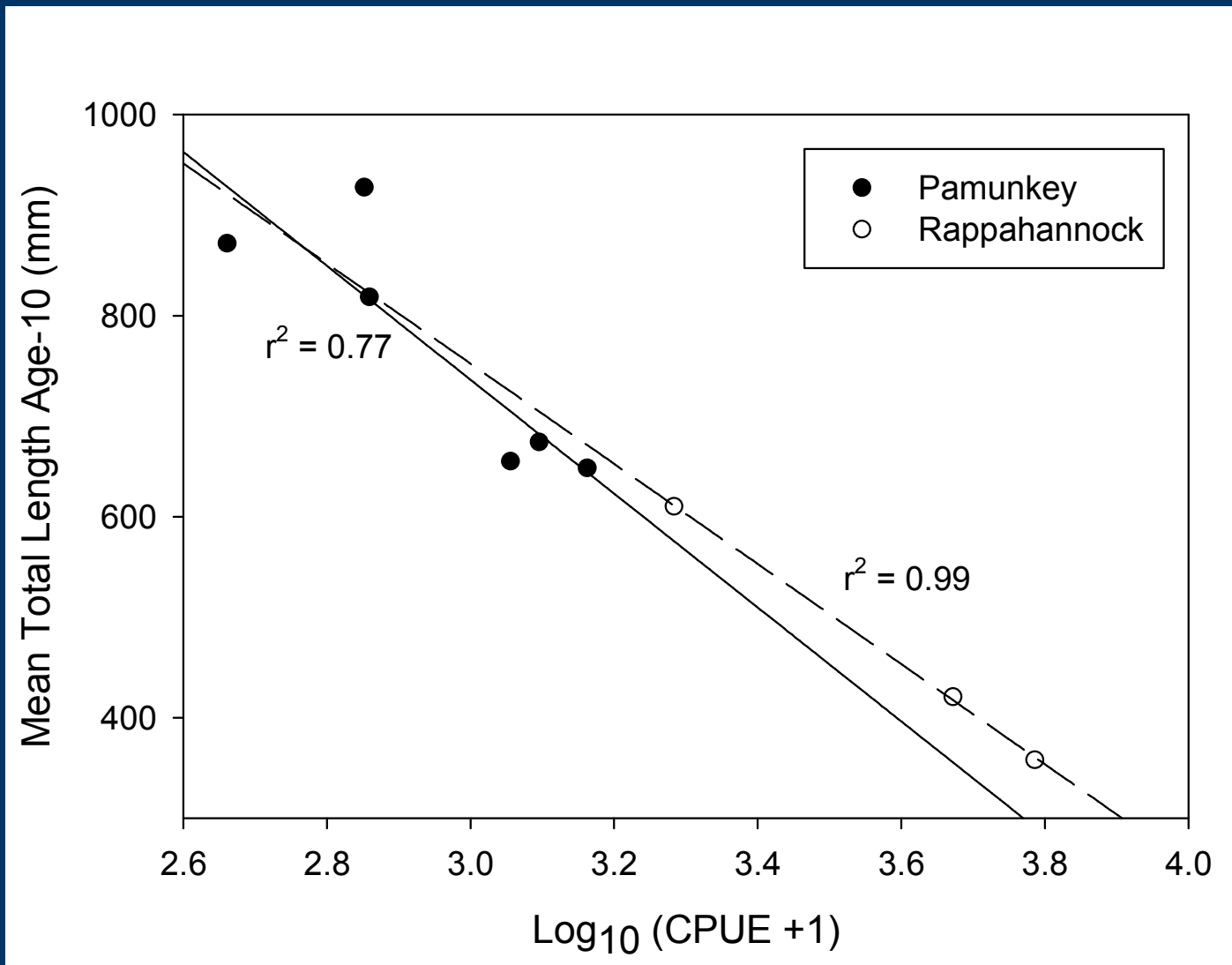


Growth – Declines in Three of Four Rivers

(mean total length-at-age and 95% Confidence Intervals)



Declines in Growth Associated With Increases in Density in Pamunkey and Rappahannock



Mattaponi – A Low Productivity System



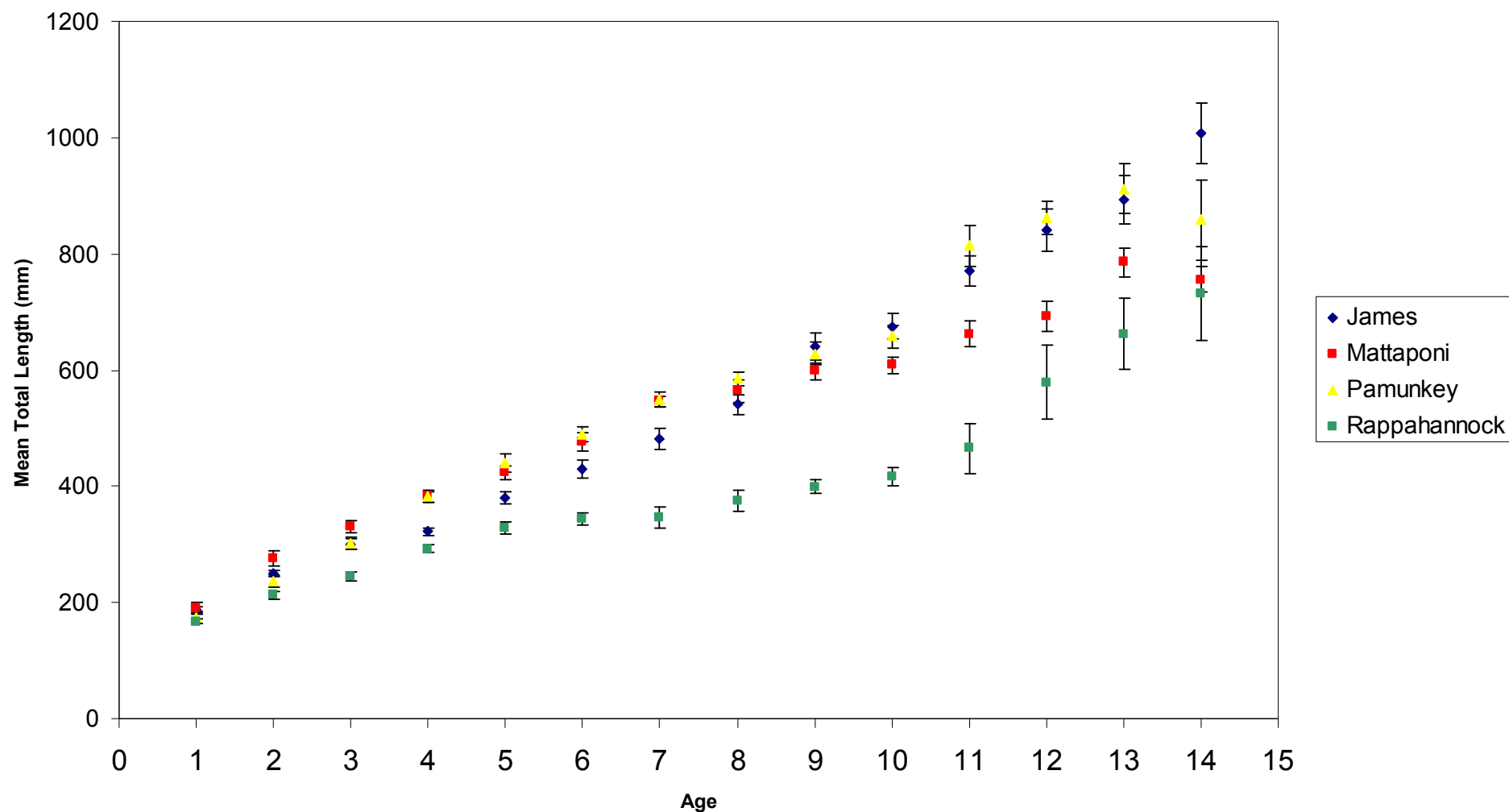


Times are Tough Redefining Gape Limitation



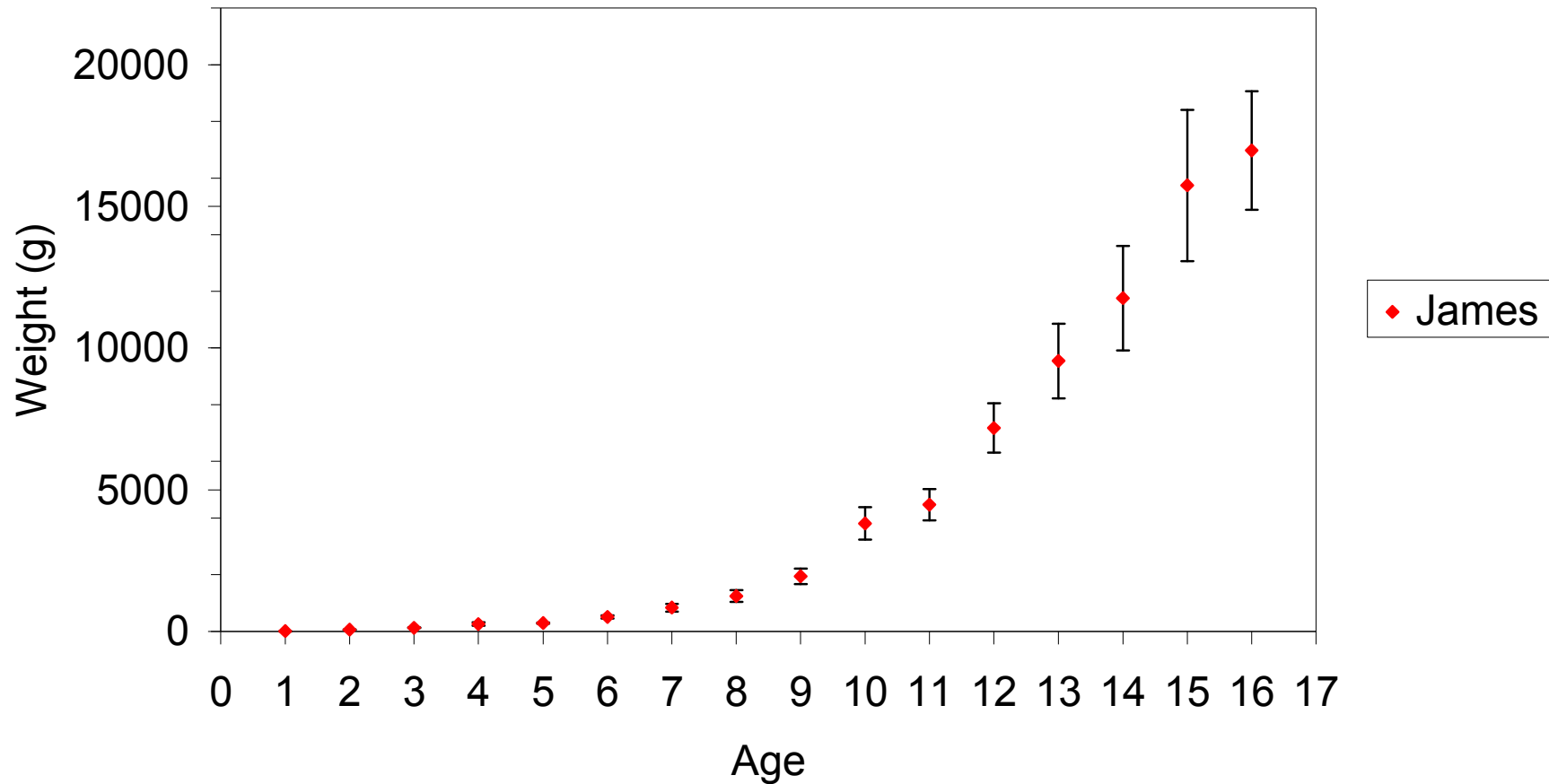
Growth Rates – Differences Among Rivers 2008

(mean total length-at-age w/ 95% Confidence Intervals)

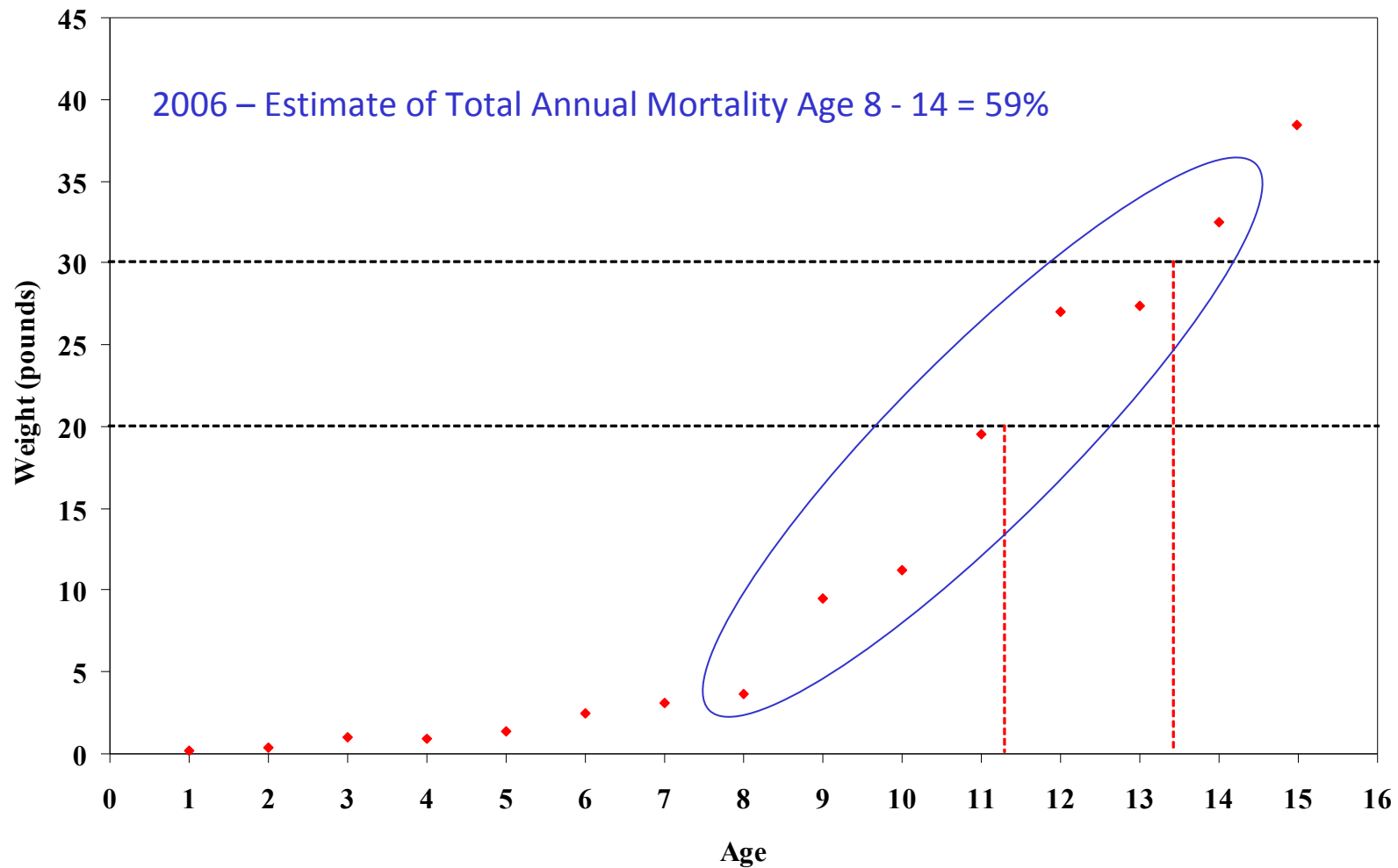


Growth Rate – James 2009

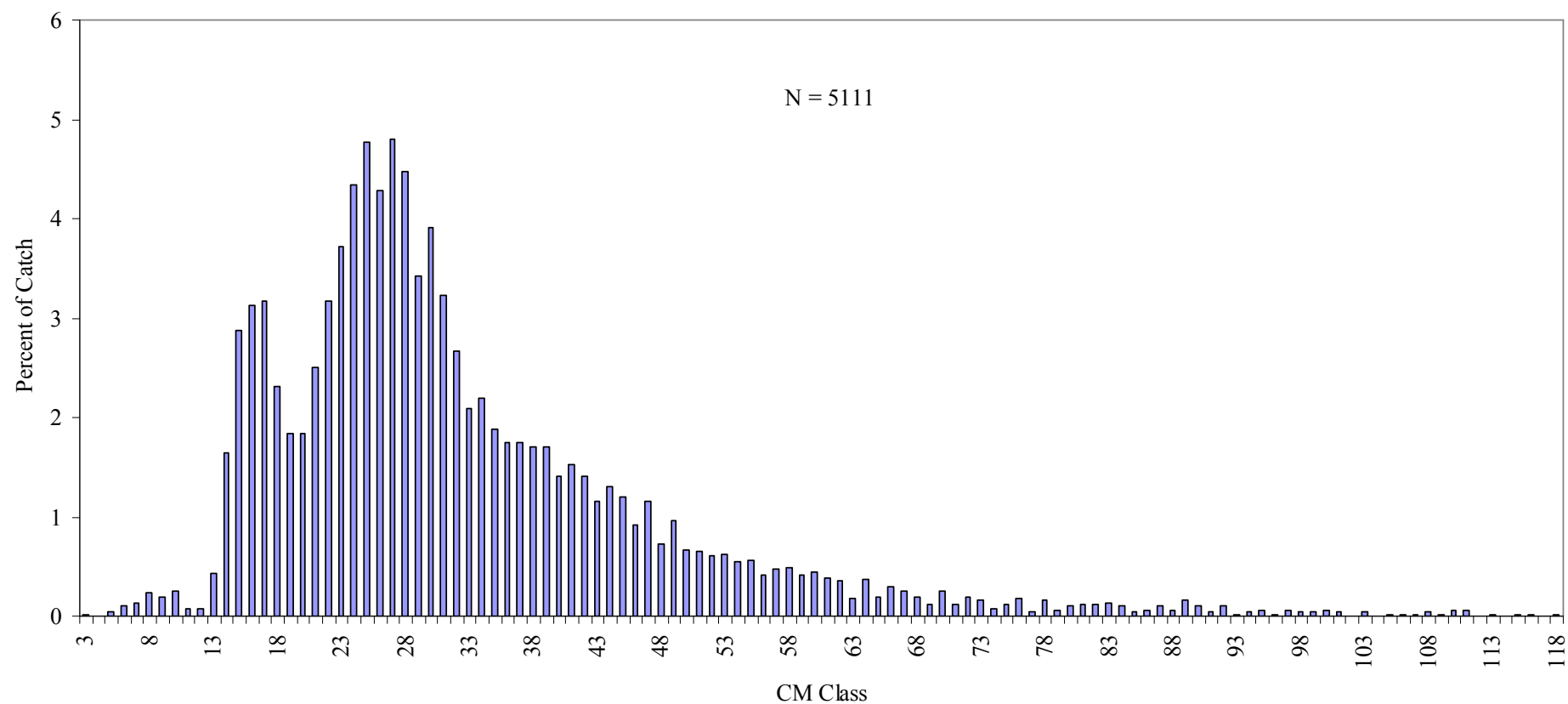
(Mean Weight-at-Age w/ 95% Confidence Intervals)



Growth Patterns and Mortality => Rare Trophy Fish

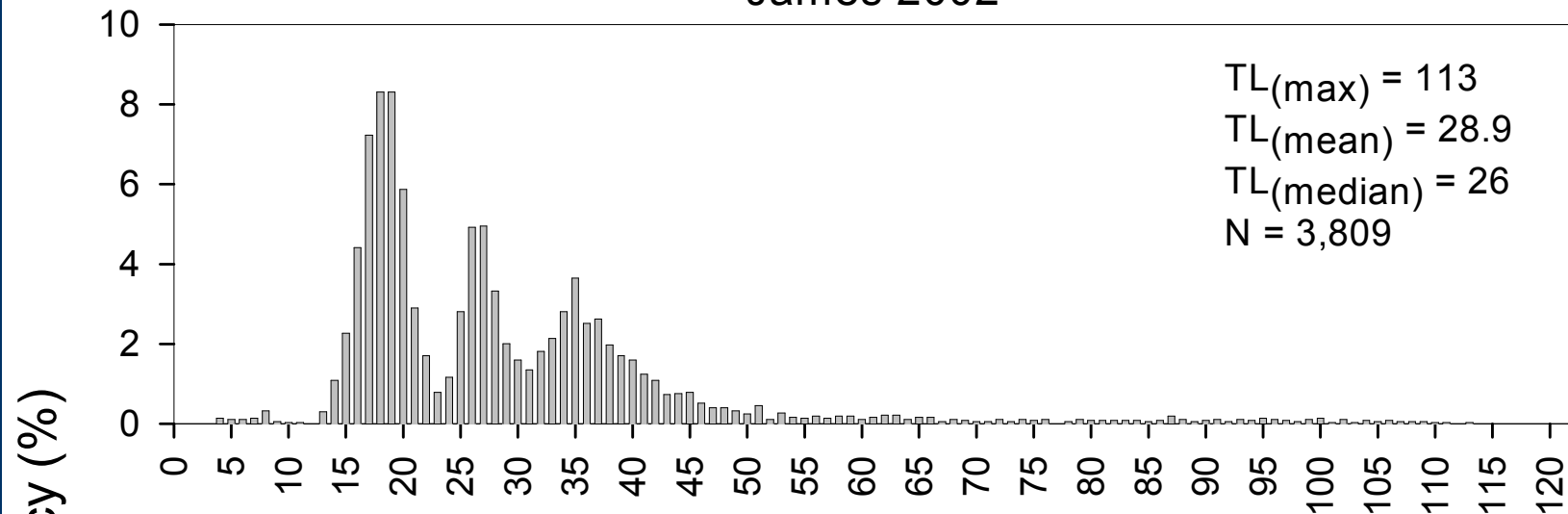


Size Distribution – James River Blue Catfish

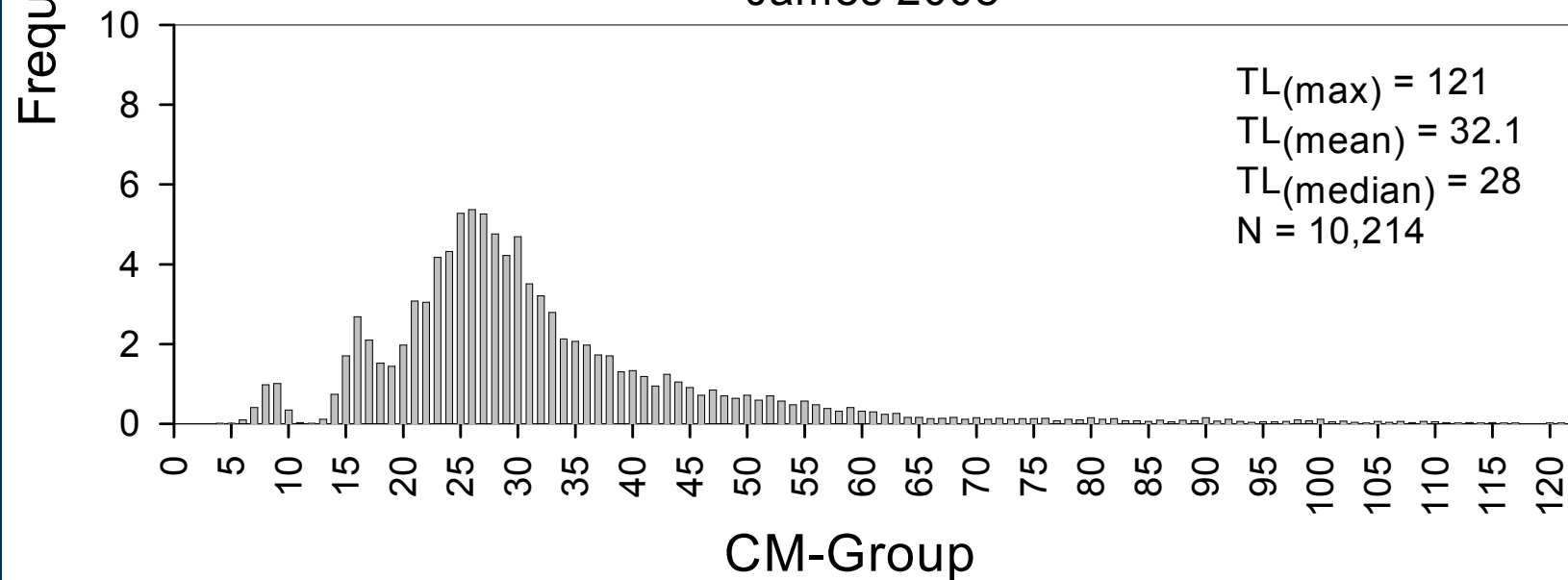


Temporal Shifts In Size Distributions

James 2002



James 2008



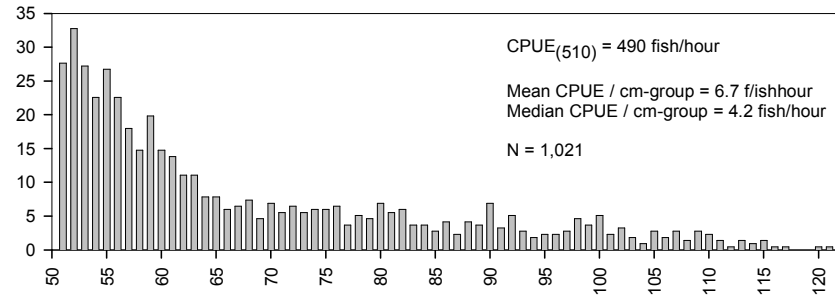
Significant Differences Among Rivers in Abundance and Distribution of Quality Size Fish

James

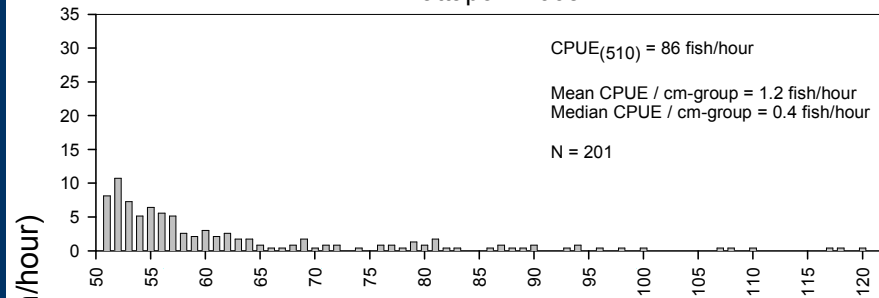
Mattaponi and Pamunkey

Rappahannock

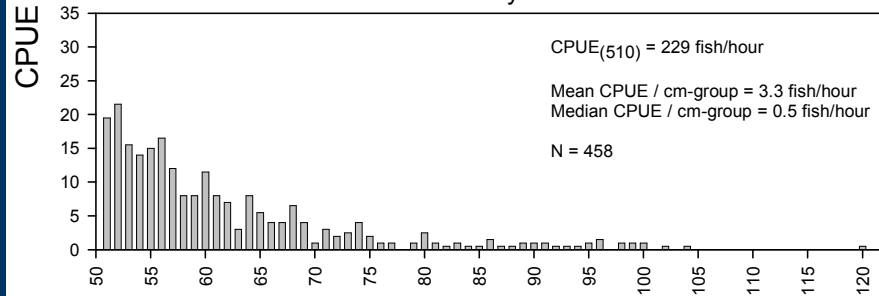
James 2008



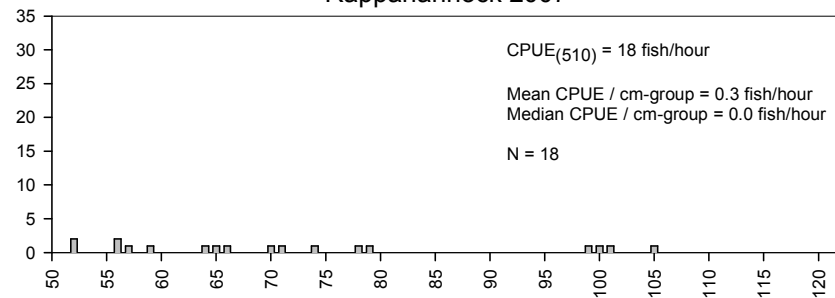
Mattaponi 2008



Pamunkey 2008



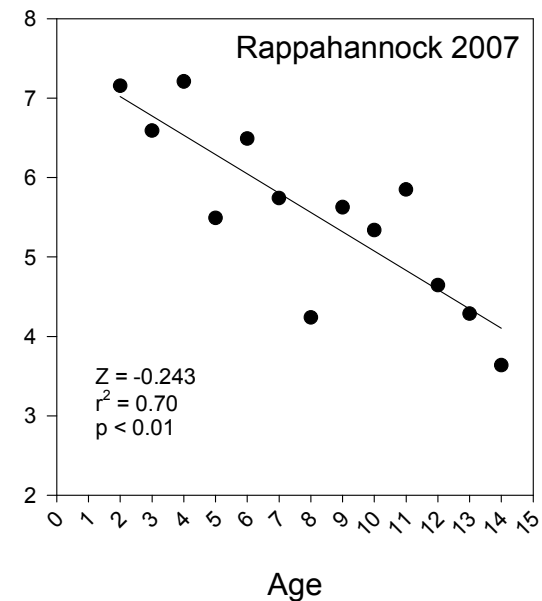
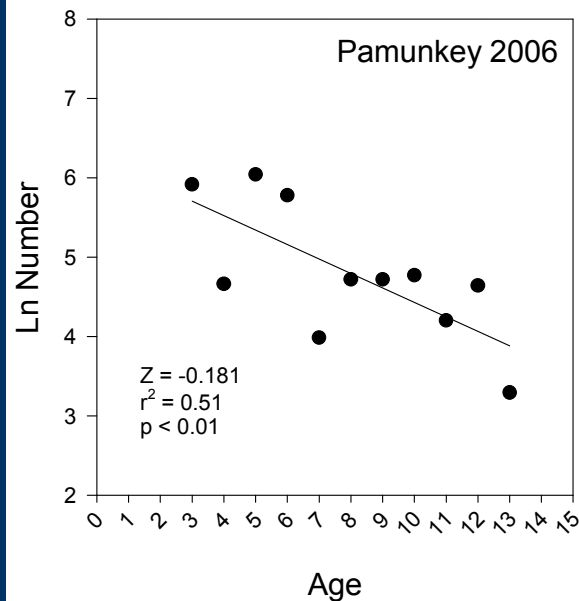
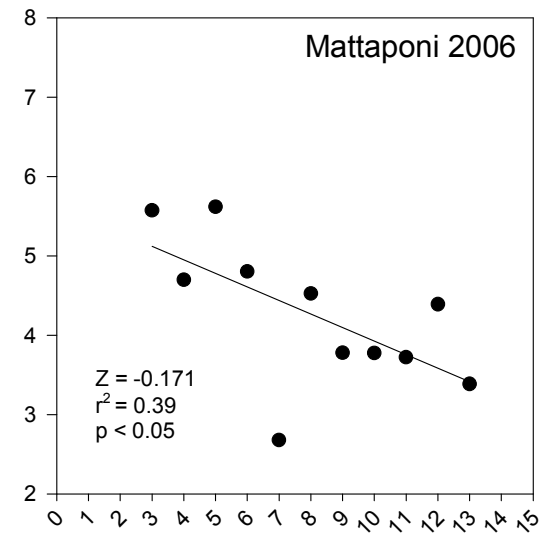
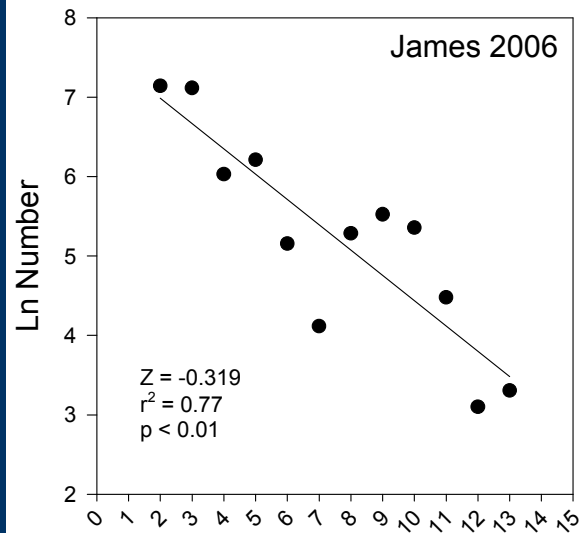
Rappahannock 2007

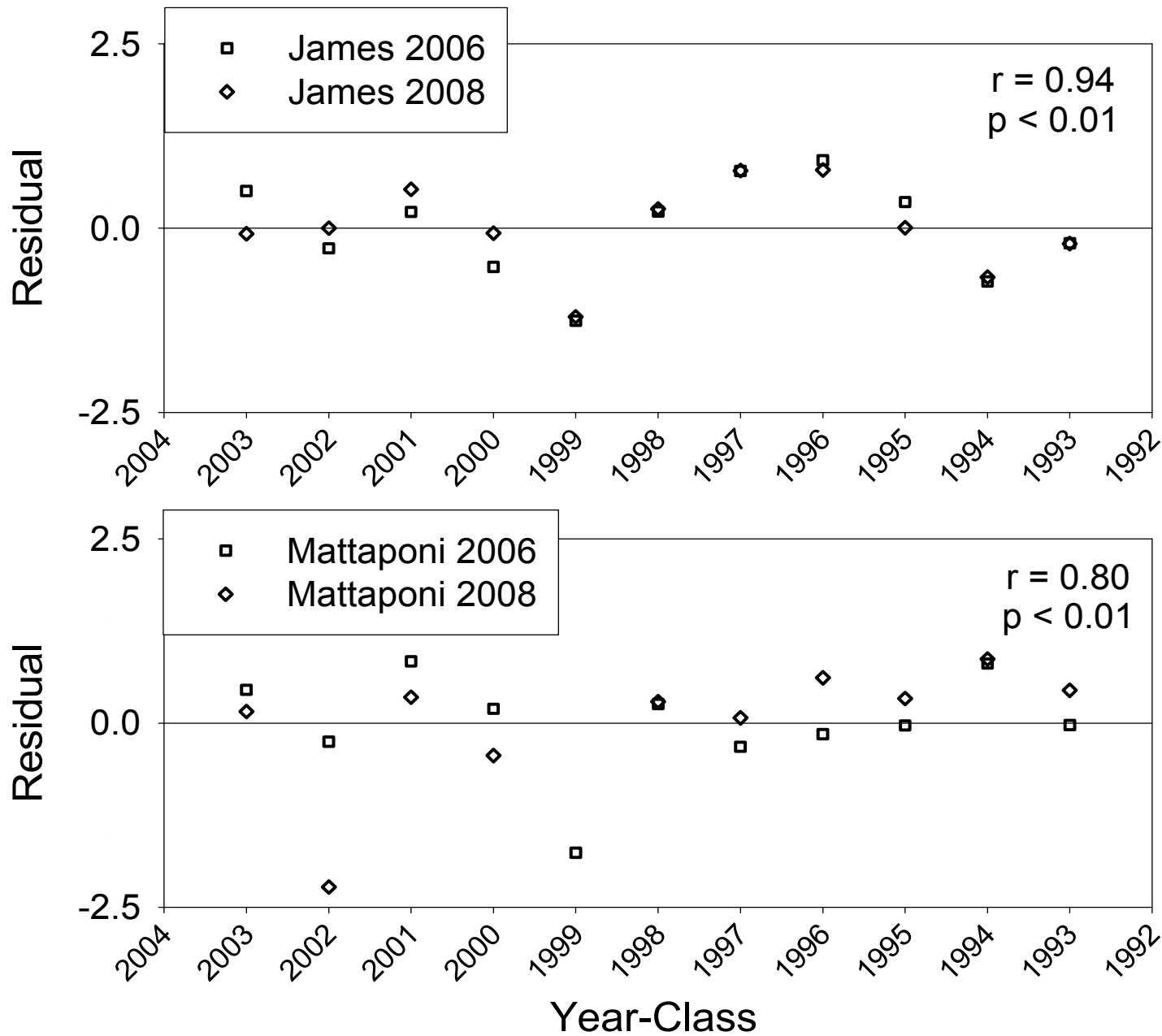


CM-Group

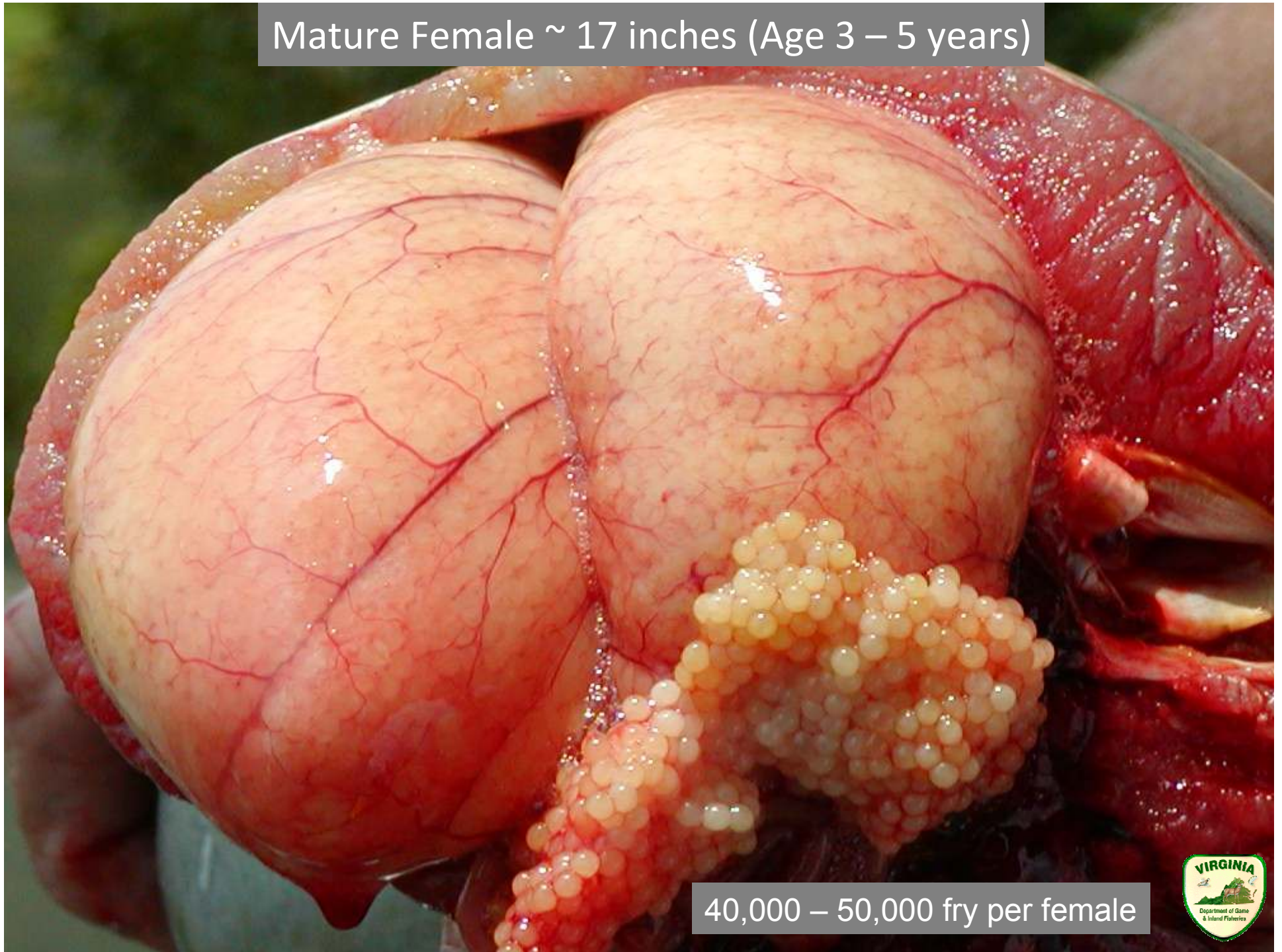


Variable Recruitment





Mature Female ~ 17 inches (Age 3 – 5 years)



40,000 – 50,000 fry per female



Conclusions

- Approximately 35 yrs post-stocking in the James and Rappahannock, and 25 yrs post-stocking in the Mattaponi... equilibrium had not been reached for blue catfish populations in Virginia tidal rivers
- With:
 - Trends of increasing density in the James and Rappahannock
 - Declining growth in the Pamunkey, Mattaponi and Rappahannock
 - Expanding age structure in the James, Pamunkey, and Mattaponi
 - And, increasing size structure in all four populations



Conclusions

- Density of blue catfish in these rivers is extremely high
 - Electrofishing CPUE ranging from 223 to 6,106 fish/hr
- With trends of increasing density in the James and Rappahannock
 - CPUE in the James and Rappahannock had reached 4,449 fish/hr and 6,106 fish/hr respectively by 2008.



Conclusions

- Differences in density, size structure, age structure, and growth among rivers were likely due, in large part, to time since population establishment and differences in watershed area and productivity.



Conclusions

- Variable Recruitment
 - In all four rivers, the 1996 year-class was strong and the 1999 year-class was weak, with a weak 2002 year-class occurring in three of the four rivers – an indication landscape-level environmental processes are involved at some level in determining recruitment in these populations.



Conclusions

- The ecological processes at work in Virginia tidal rivers are generally poorly documented, and information regarding trophic interactions and food web dynamics is lacking.
 - The impact this abundant introduced predator eventually will have on these systems is unknown and may be hard to define, given this lack of information.
 - Further work to address these information gaps is needed.



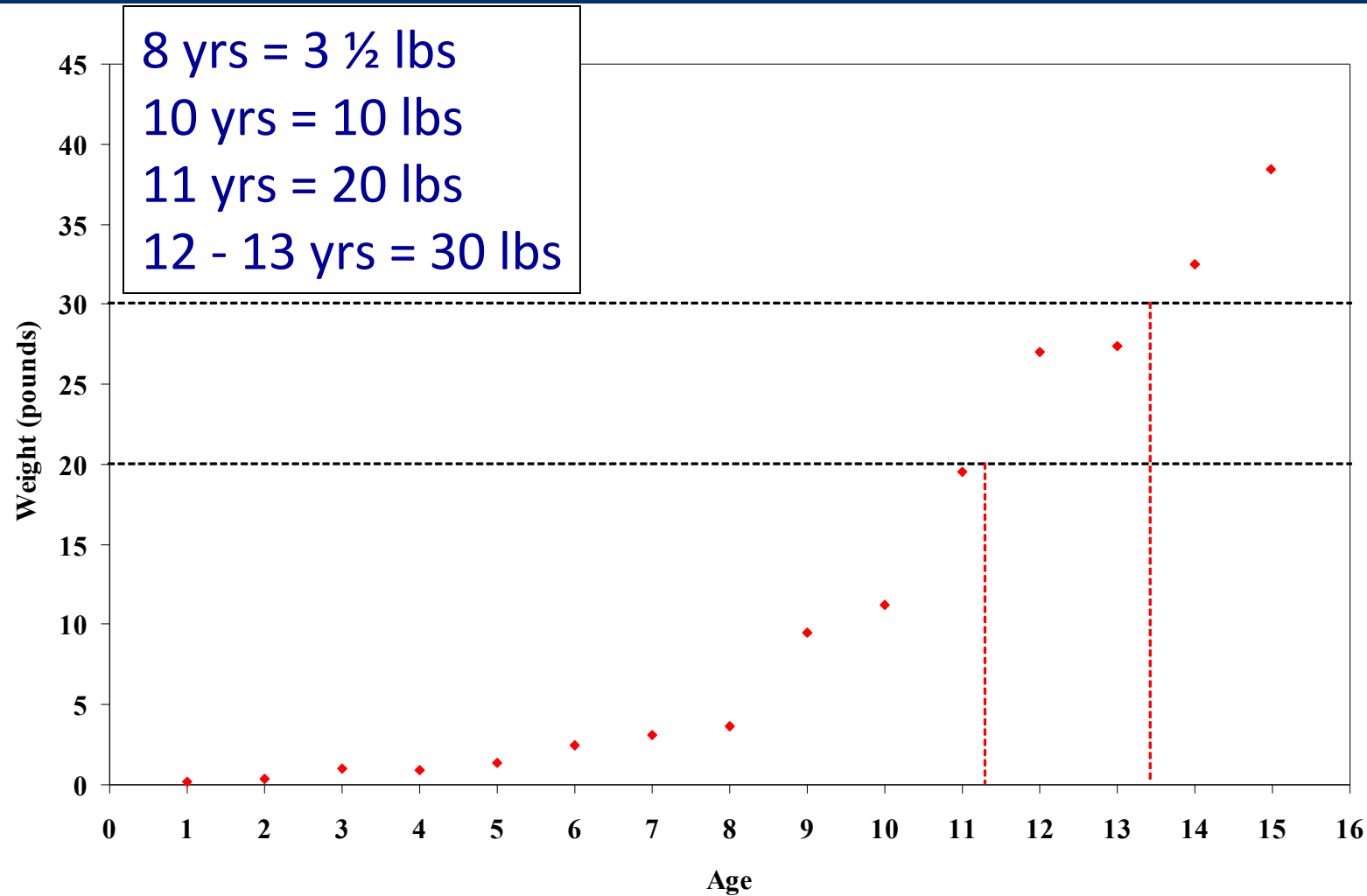


Conclusions

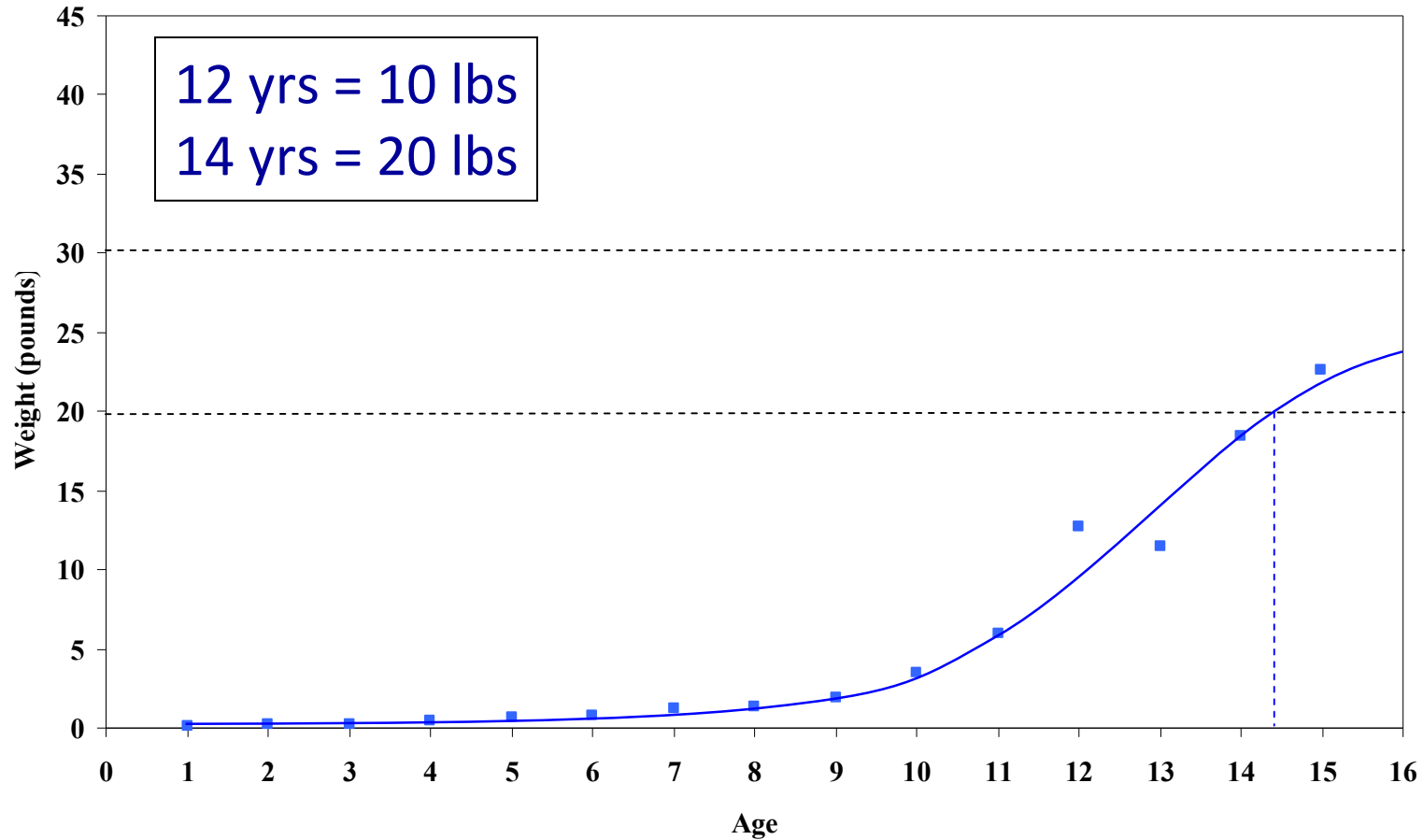
- The dramatic increase in population density in the James is of concern, with implications for the trophy fishery it supports.
 - Although no change in growth has been detected to-date in the James, declines in growth associated with increases in density have occurred in the Pamunkey and Rappahannock.
- Until the James population stabilizes (i.e. reaches an equilibrium state) concerns will remain regarding the trophy component of this important recreational fishery.



Growth in James River



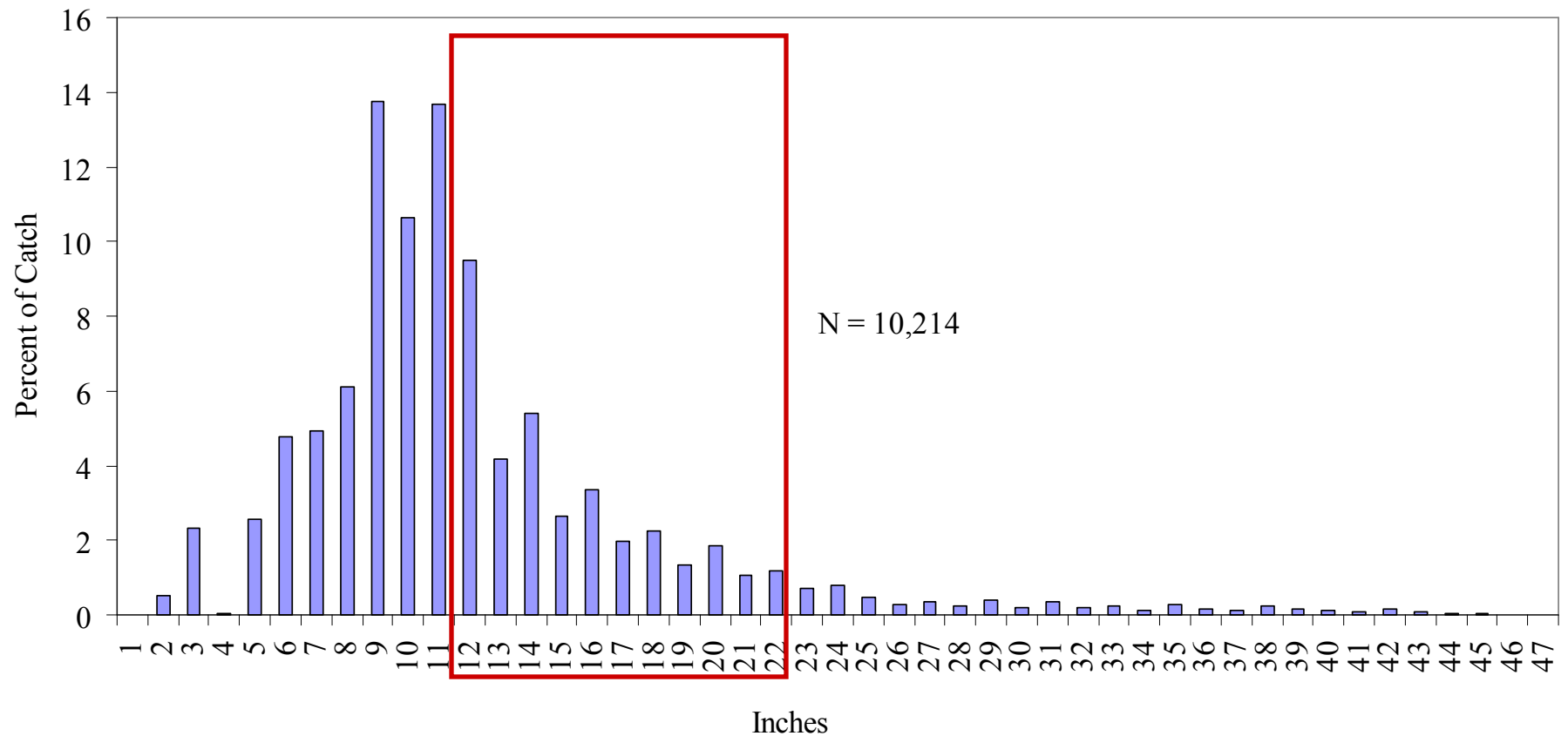
Growth in Rappahannock River



Is this to be the fate of the James River population?



Vast Increases in Harvest Could be Beneficial If Markets Would Support And Human Health Issues Addressed



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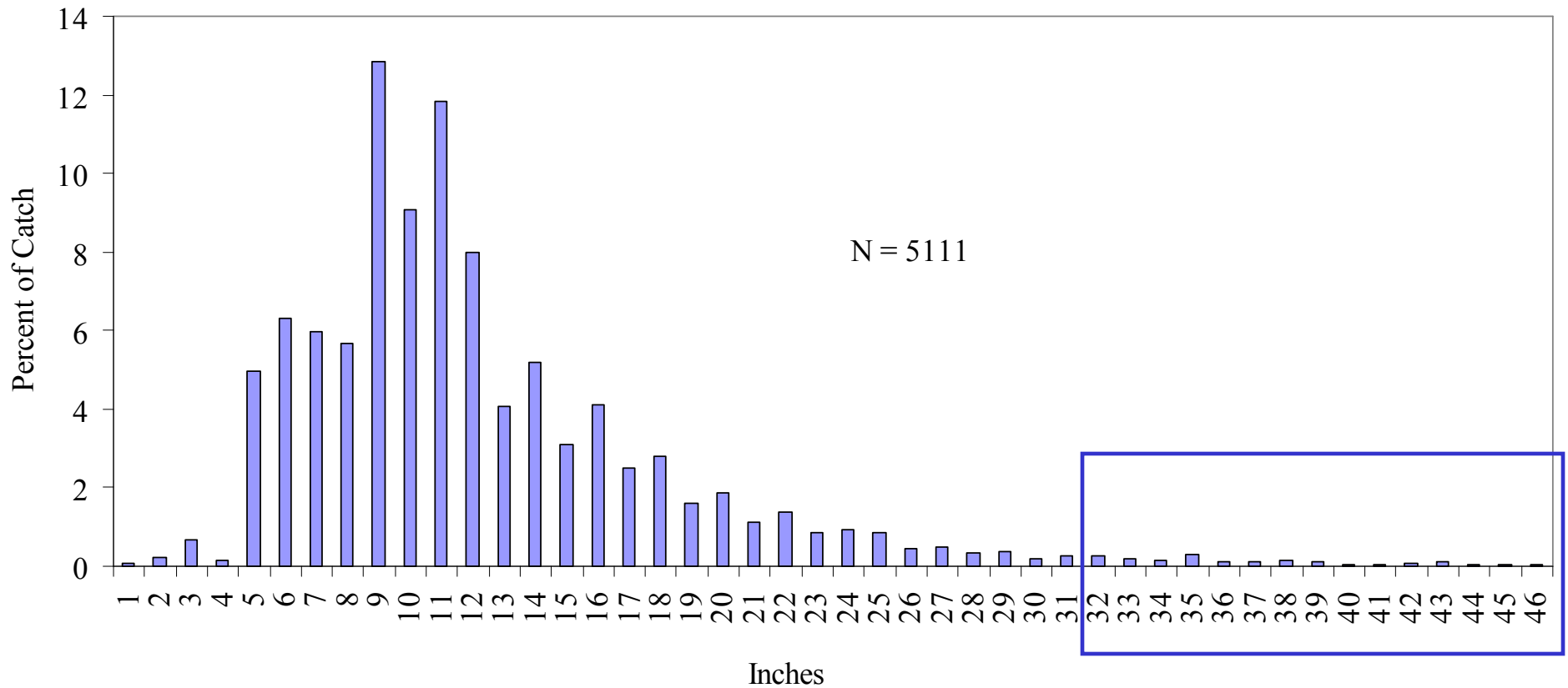


The 32 Inch Regulation

- Background
 - Anglers request protection for larger fish
 - Biological information indicates a “trophy” regulation is warranted
 - High mortality
 - Potential to “Recycle” fish
 - Virginia Department of Health (VDH) advisory
 - No consumption of blue catfish over 32 inches
 - DGIF contacts VMRC and others regarding impacts on the commercial fishery
 - DGIF staff proposes regulation to Board
 - Biological data
 - VDH advisory
- 2005
 - Public comment period
 - October, staff recommendation to Board
 - December, Board passes
- July 1, 2006 regulation goes into effect

Blue Catfish Size Distribution

Trophy regulation protects less than 1% of the resource

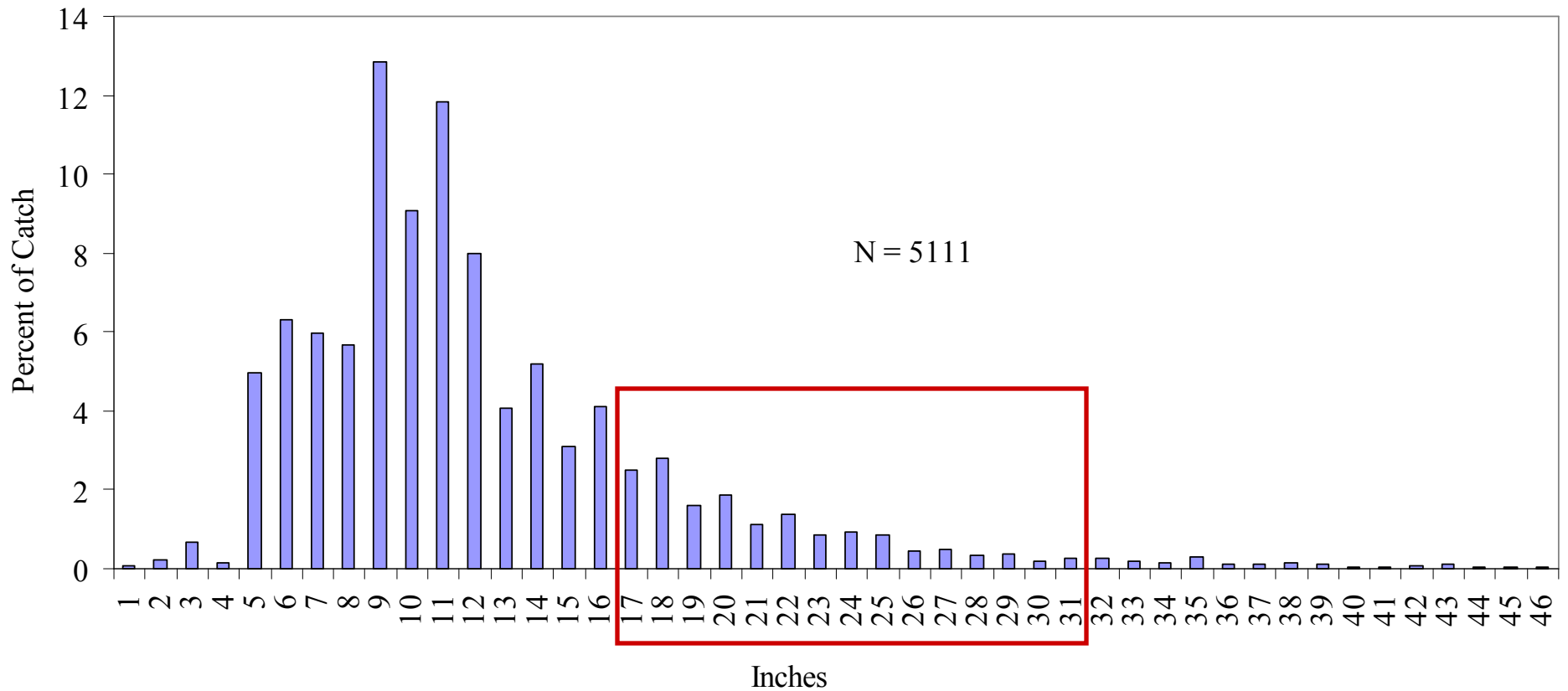


- Trophy fishery – multimillion dollar input to regional economy



Blue Catfish Size Distribution

Tidal James River – 2006



Red Box – Breeding population not affected by trophy regulation

