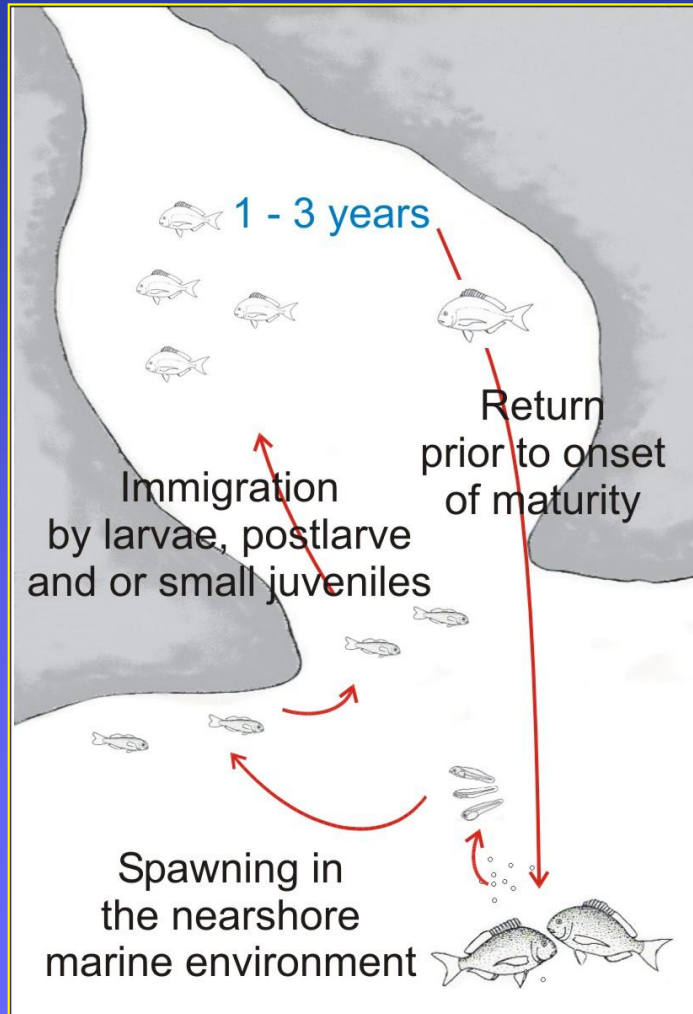


Using long-term monitoring data to determine trends in abundance, recruitment and residency of two sparid fishes in an intermittently open estuary

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Introduction

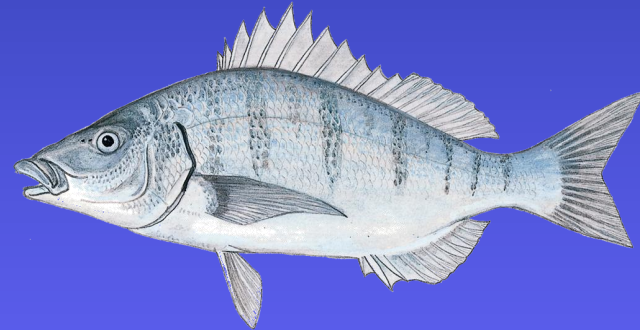


- 142 estuary-associated fish taxa
- 37 (26%) are entirely dependent on estuaries as nursery habitats
- Life history, biology and behaviour differ
- Influence abundance and response to environmental parameters

- Understand the factors responsible for controlling long-term fluctuations
- Two estuary-associated species that comprise an important component of the marine fish assemblage

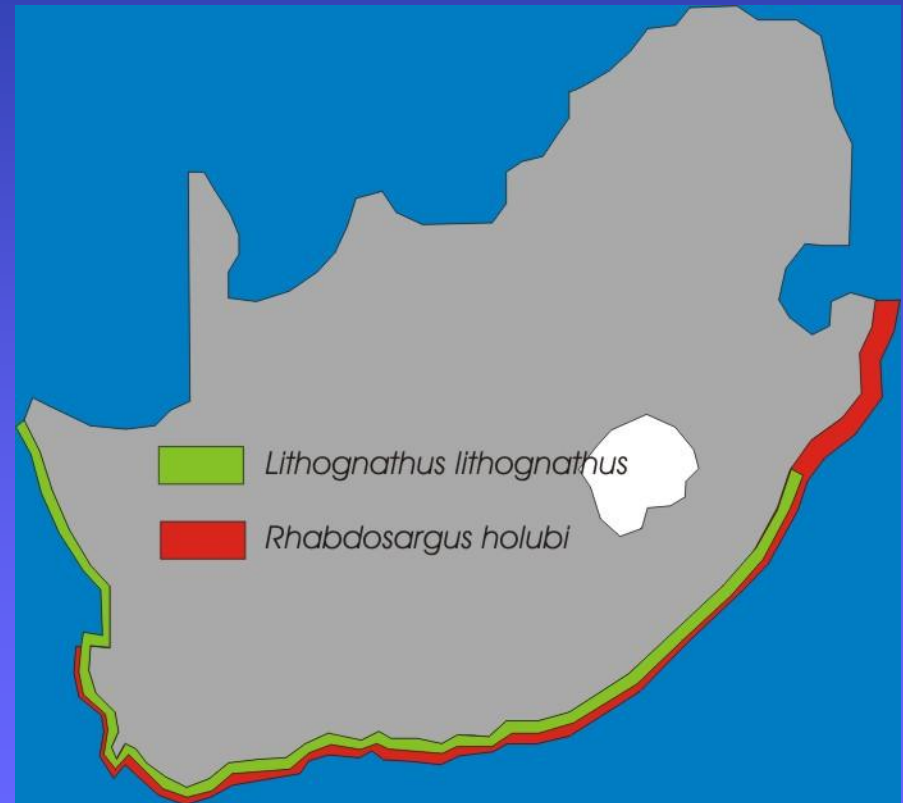


Cape stumpnose
(*Rhabdosargus holubi*)



white steenbras
(*Lithognathus lithognathus*)

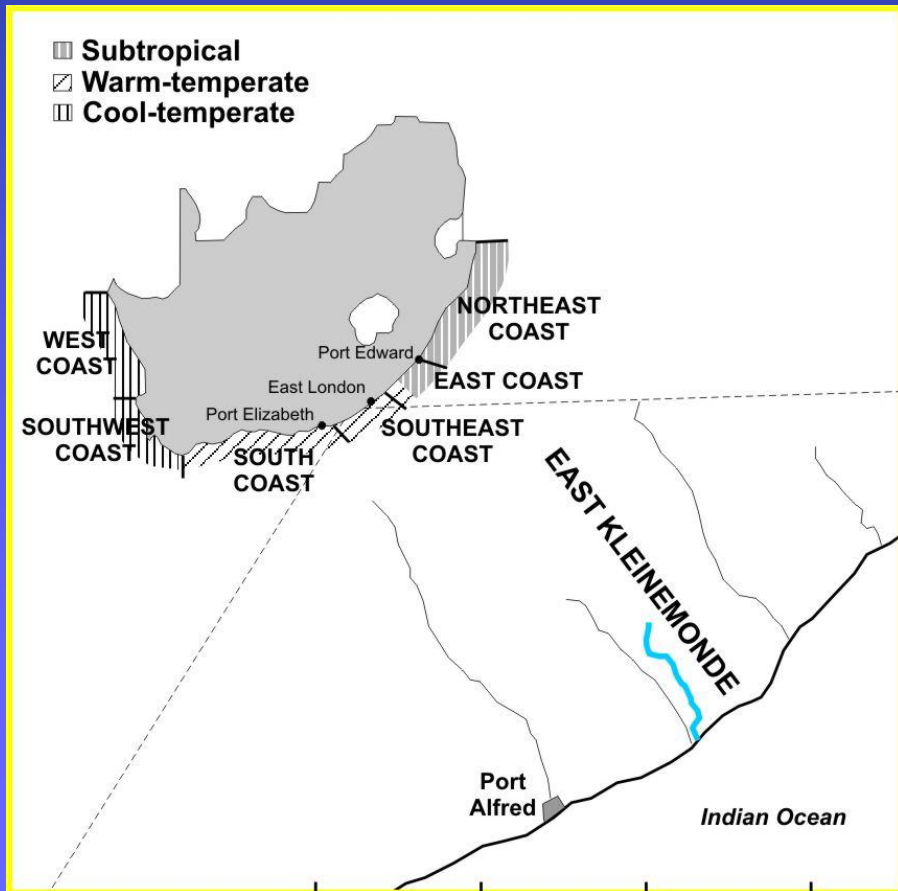
- Sparid family
- Endemic to southern Africa
- Entirely dependent on estuarine habitats for at least the first year of life
- Biology and life history very different
- Affects response to fluctuations in environmental variables within and outside estuaries



Aim

- To use long-term data to assess variation in the use of an intermittently open estuary by juvenile Cape stumpnose and white steenbras
- Data are presented on long-term changes in the timing of recruitment, the period of residence, growth and habitat use while in the estuarine environment

Study area



- Small, mostly shallow estuary (3 km, > 1 m deep)
- Usually only opens after heavy rainfall
- Rainfall is highly variable
- When the mouth is closed seawater can enter the system via overwash events

Methods

- The estuary has been sampled biannually, from December 1994 to July 2008
- Fish were sampled using a seine net and a fleet of gill nets
- All fish caught were identified and measured to the nearest mm SL
- The state of the estuary mouth was recorded daily since 1993 and logged as closed, open or overwashing (small < 3hrs, or large > 3hrs)

Results and discussion



Recruitment events

- The mouth of the East Kleinemonde predominantly closed
- The mouth dynamics of the system change on an annual basis, with the mouth not opening at all in 1999 to being open 31% of the year in 2006
- Overwash events can occur for up to 27% of the year



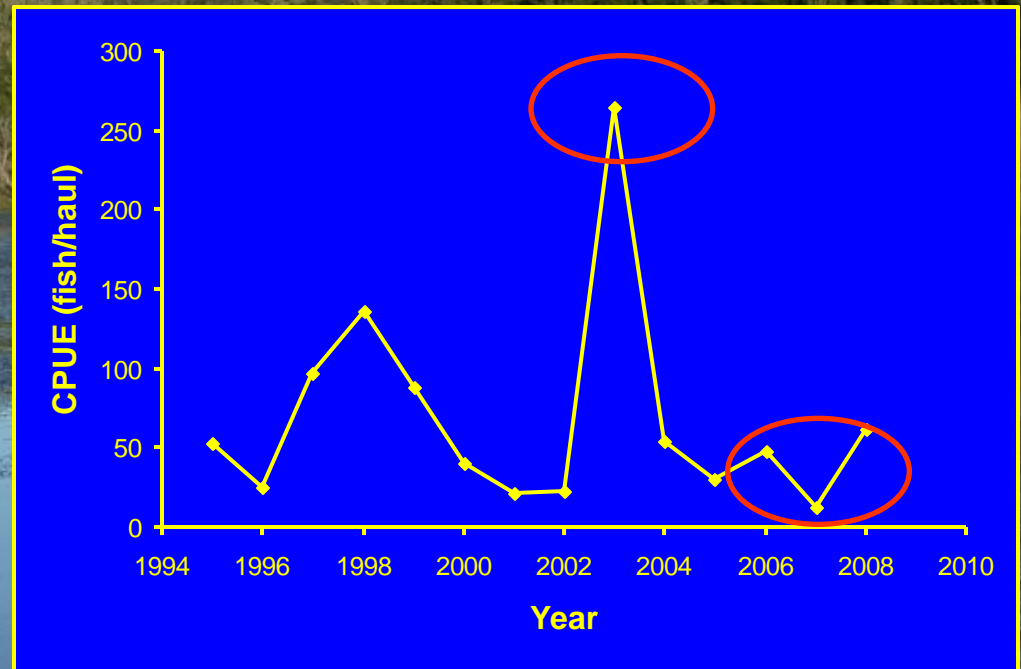
- The timing of mouth opening and overwash events also highly variable
- Incidence of spring recruitment events increasing from 2000 - 2006

Abundance and length frequency

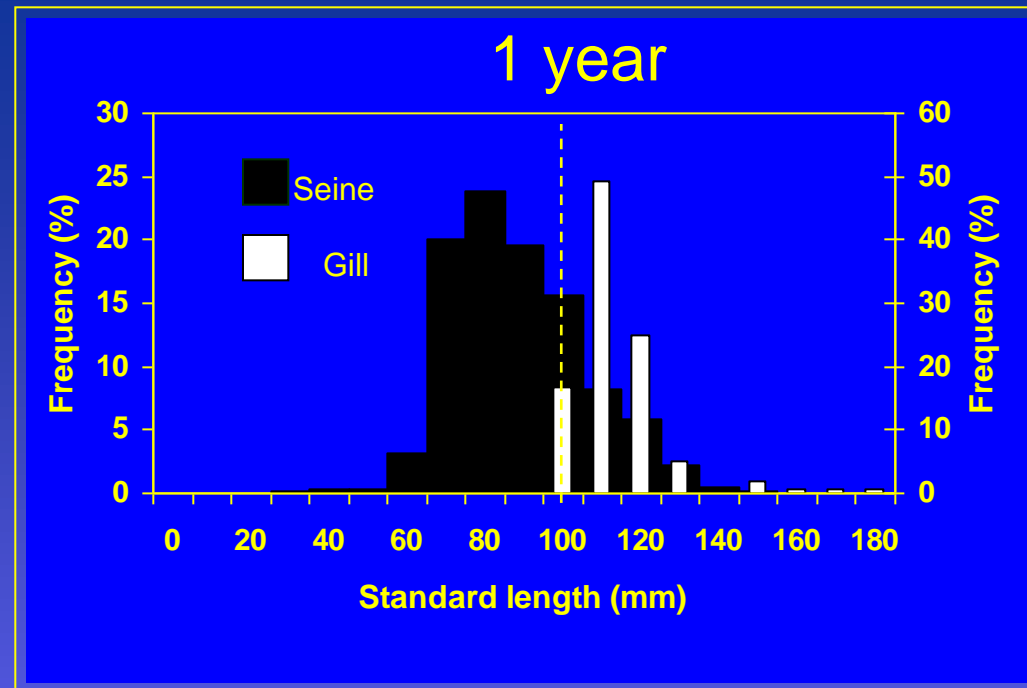


Cape stumpnose

- Large numbers of juveniles found in estuaries
- Comprised between 28% and 92% of the annual seine catch and between 0% and 30% of the annual gill-net catch
- Mean annual CPUE varied considerably

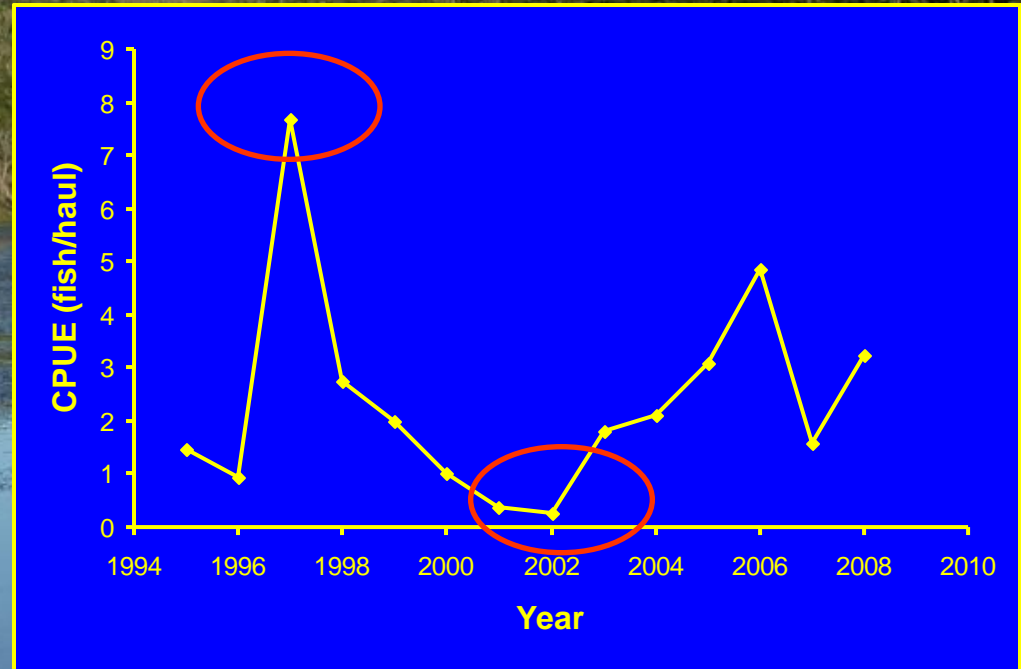


- Ranging in size from 12 to 176 mm SL
- The majority of individuals caught in the seine net were between 70 – 80 mm SL
- Gill nets selected for larger individuals

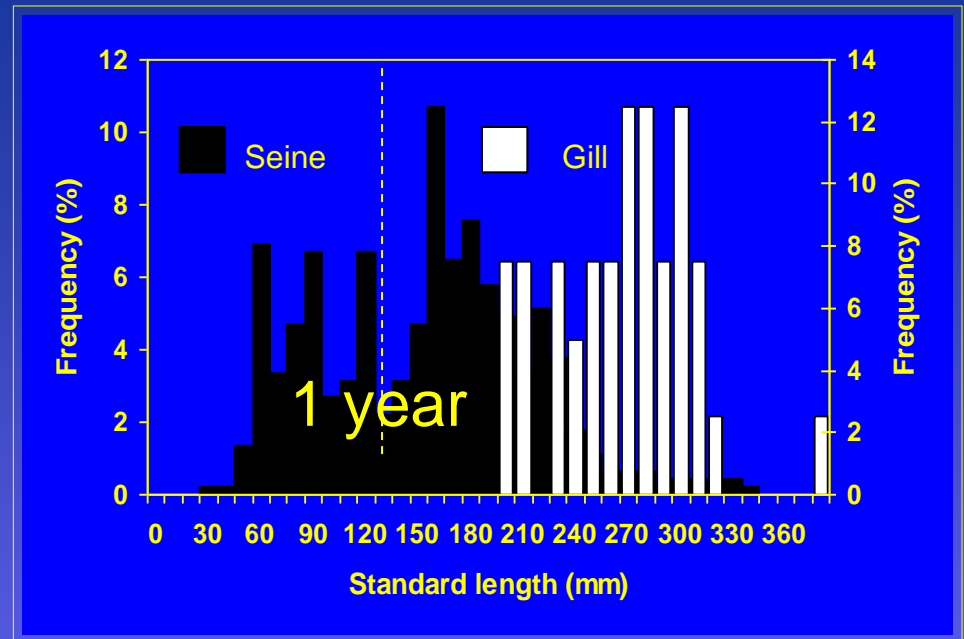


White steenbras

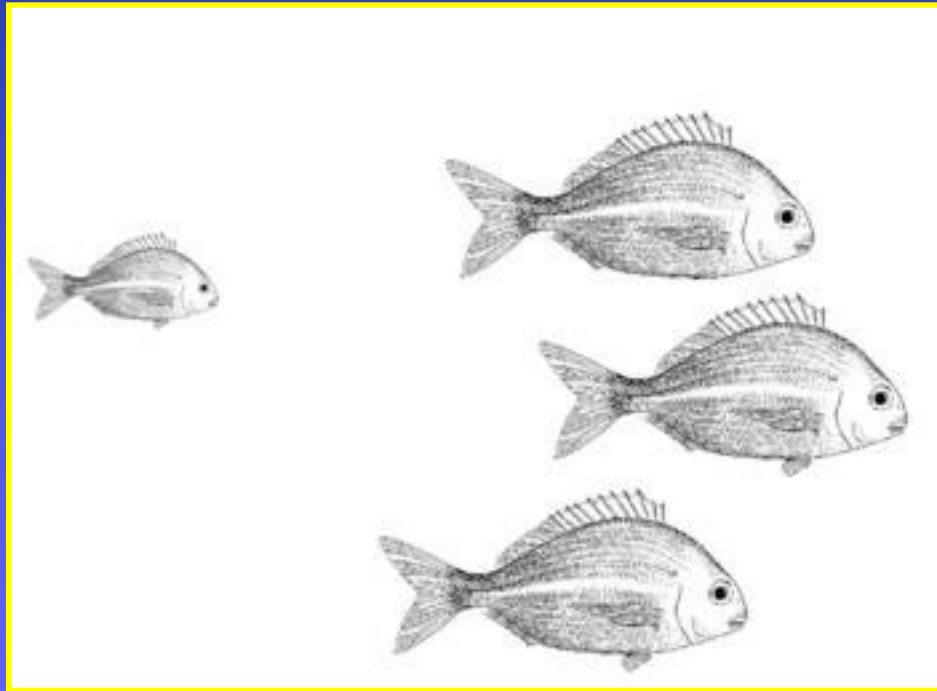
- Juveniles also found in warm-temperate estuaries but in smaller numbers
- Targeted by both coastal and estuarine anglers
- Comprised between 1% and 5% of the annual seine catch and between 0% and 22% of the annual gill-net catch
- Mean annual CPUE varied considerably



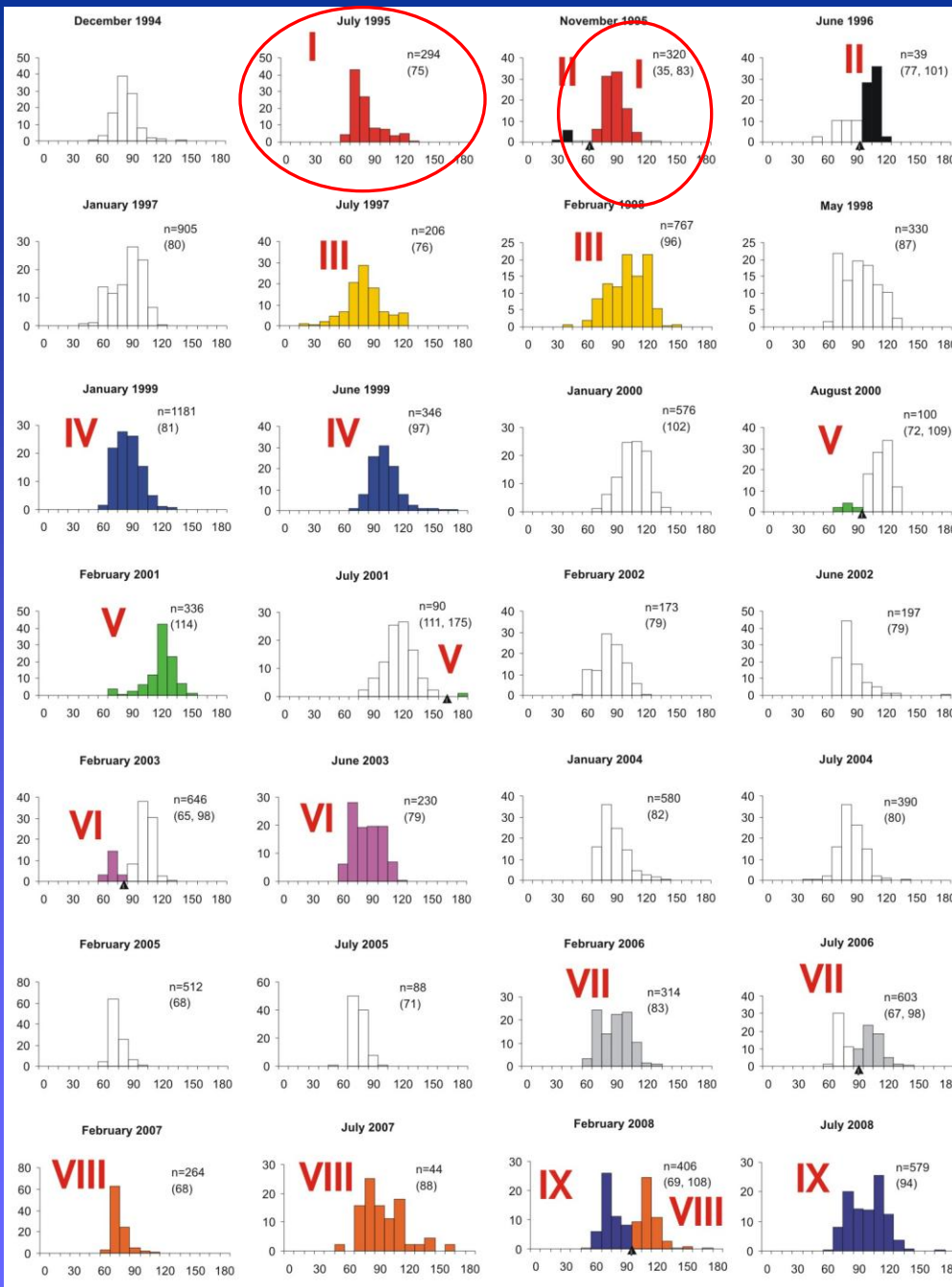
- The population ranged from 14 to 390 mm SL
- The majority of individuals in the seine net were > two years old
- The gillnets targeted larger individuals, the majority being older than two years

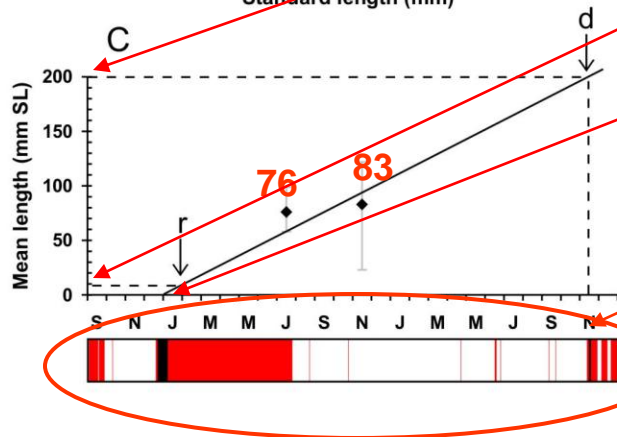
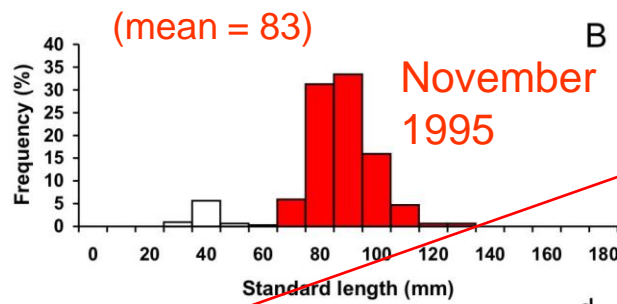
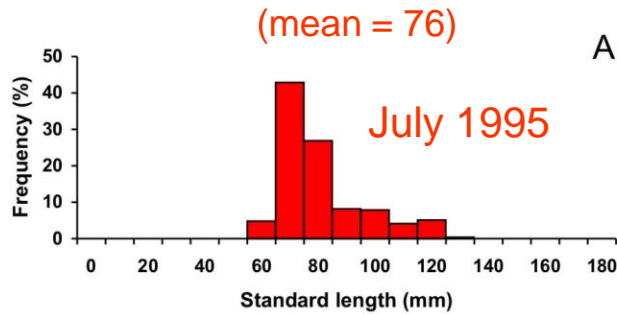


Recruitment and residency



Biannual length-frequency distributions for Cape stumpnose





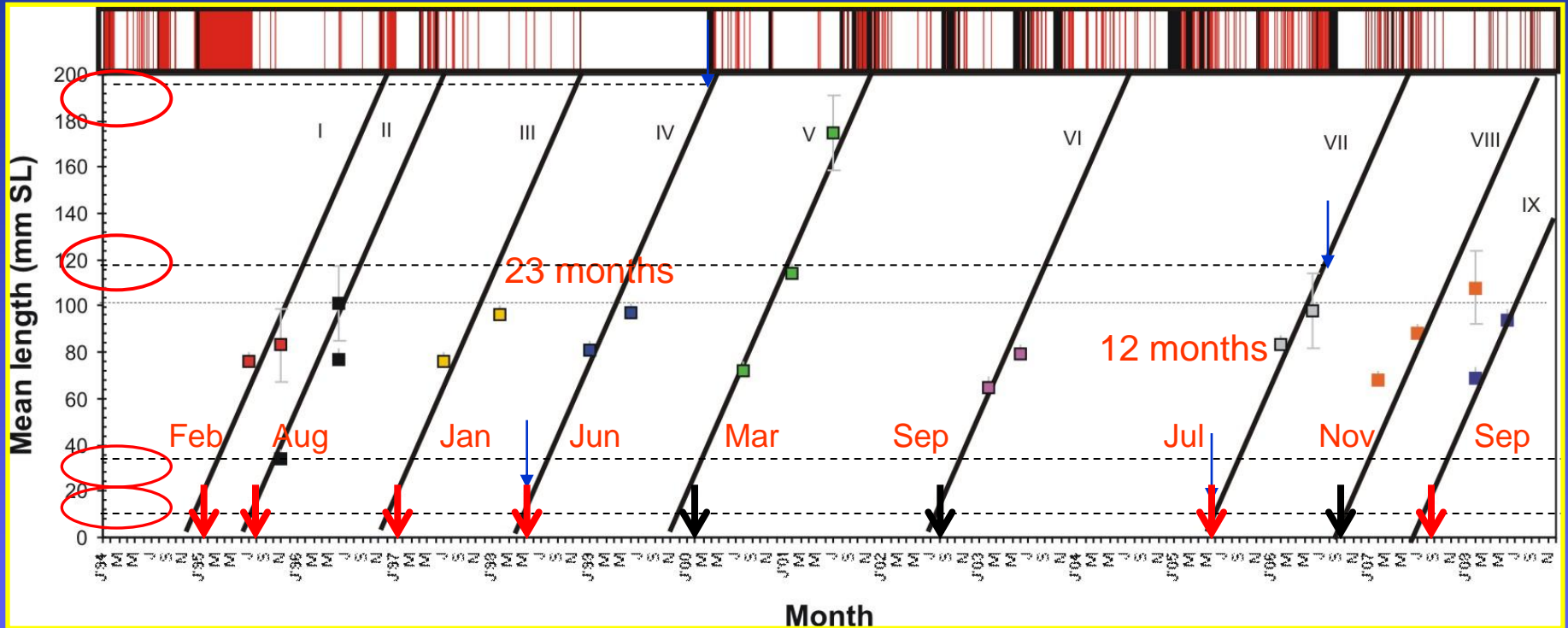
Cohort I

Size at departure

Size at recruitment

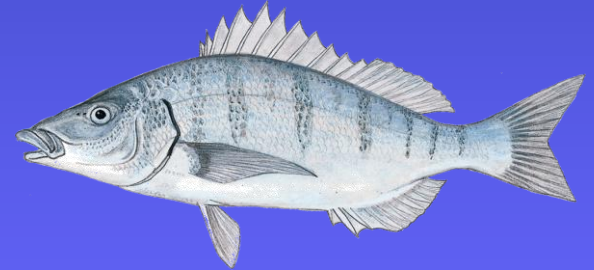
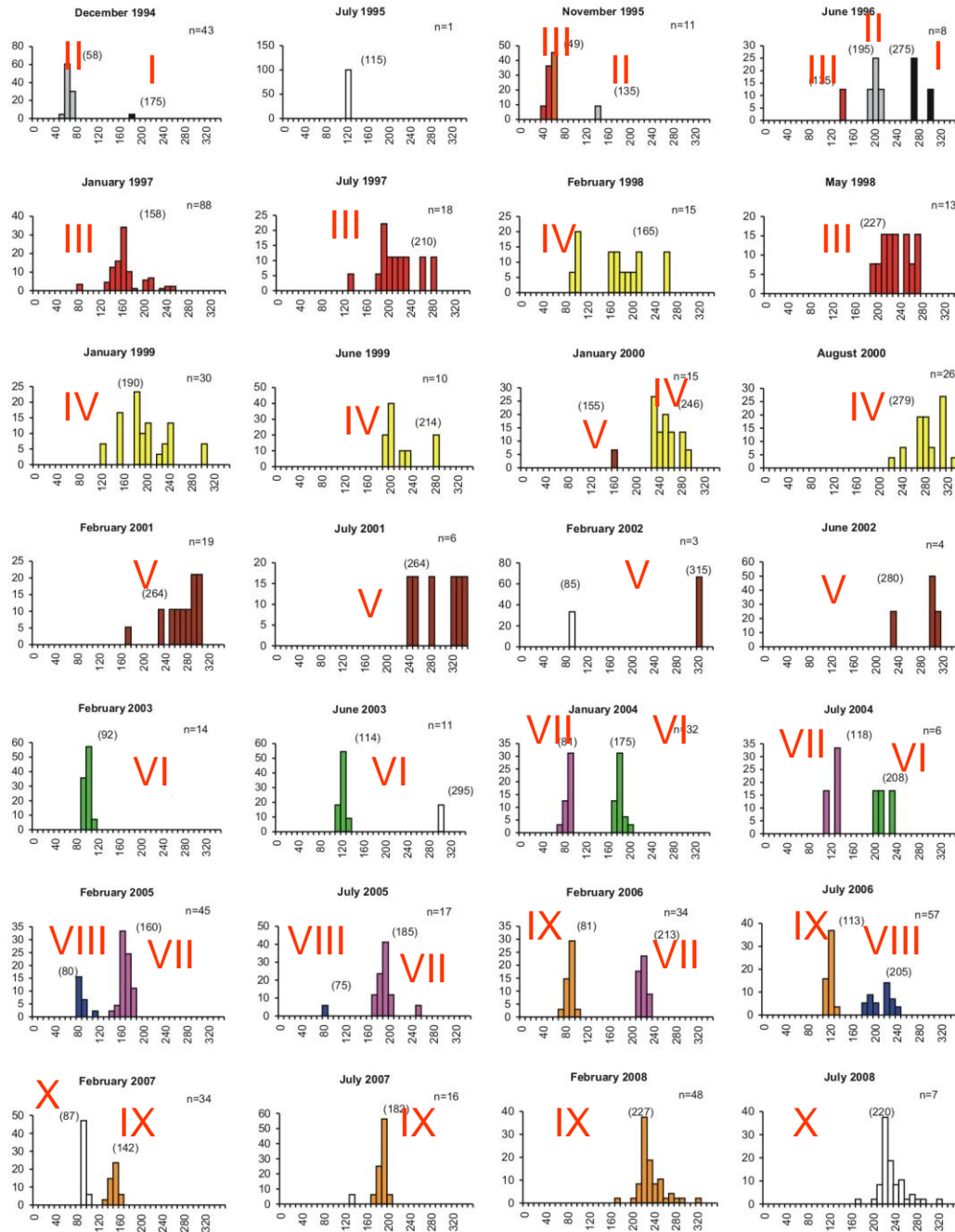
Recruitment

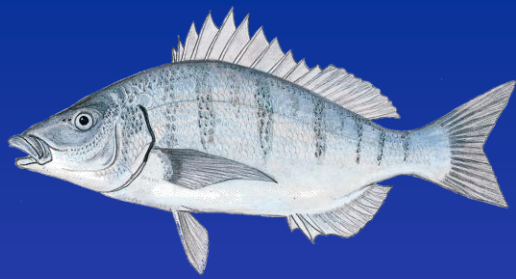
Departure



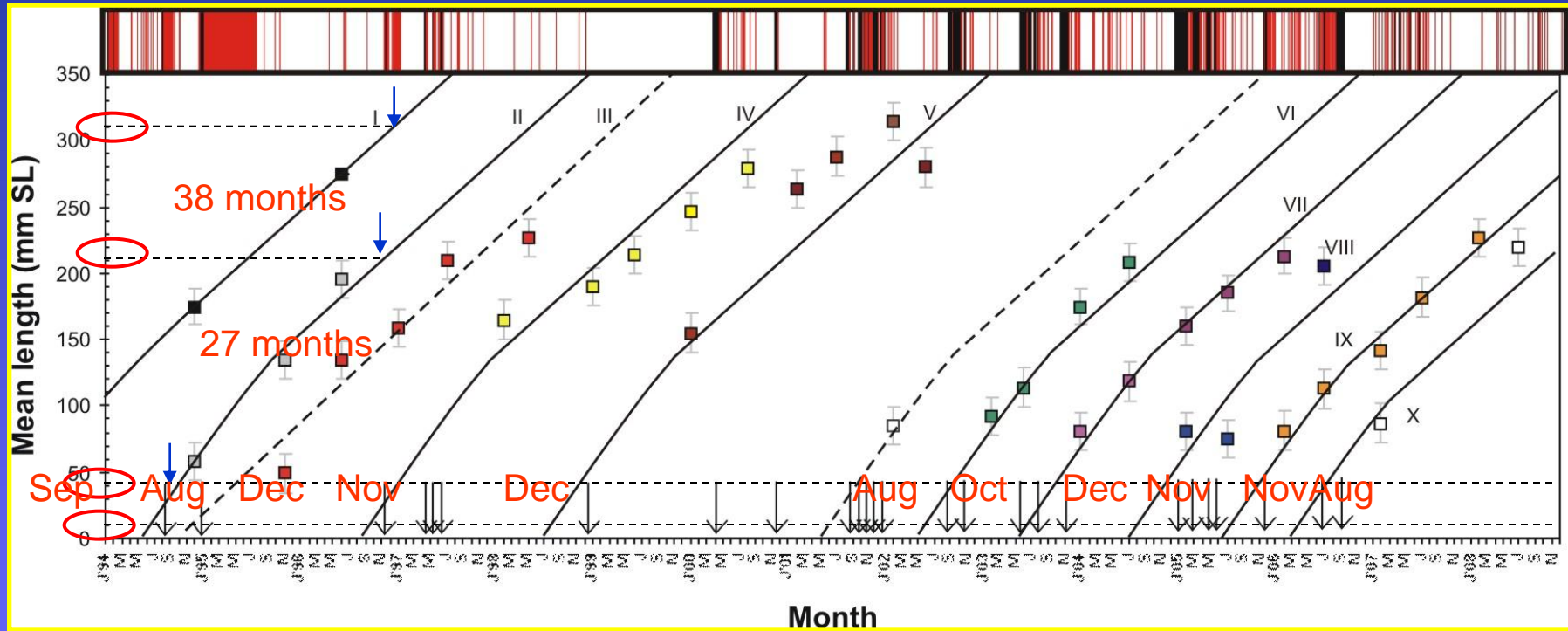
Recruitment, growth and residency of Cape stumpnose (red bars = overwash events, black bars = mouth opening)

Biannual length-frequency distributions for white steenbras





Recruitment, growth and residency of white steenbras (red bars = overwash events, black bars = mouth opening)

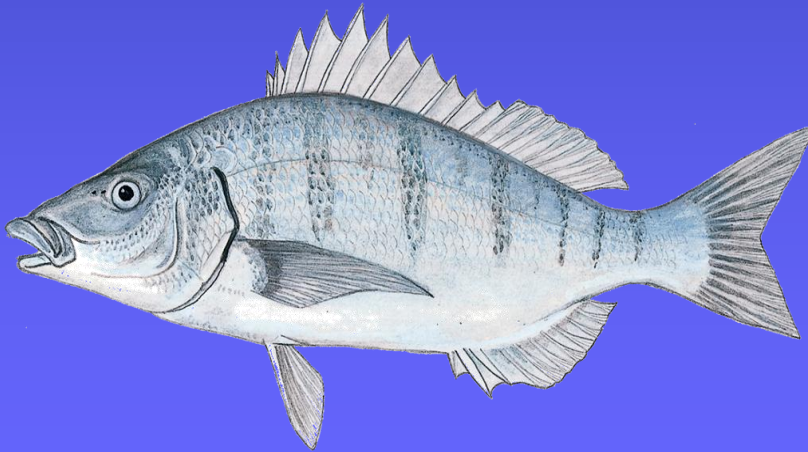


Summary

- Cape stumpnose has an extended juvenile recruitment period, white steenbras has a short, well-defined recruitment period
- Cape stumpnose use overwash events, white steenbras only access estuaries during the open mouth phase
- Cape stumpnose remain in estuaries for less than two years and do not return, white steenbras may remain for up to four years

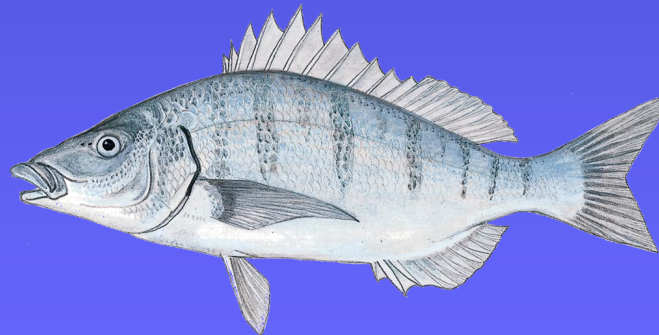


- Better adapted to making use of IOES as nursery areas
- Recruitment strategy may account for the dominance of this species



- Vulnerable to decline as a result of human activities
- Important component in catches of coastal and estuarine anglers

- Catch data indicates major declines
- High degree of estuarine dependence, confinement of juveniles and sub-adults to the surf-zone, large size at maturation and predictable spawning aggregation – vulnerable to estuarine degradation and overfishing (Bennett 1993¹)
- Short recruitment period
- Inability to access IOEs during overwash events



¹Bennett BA (1993) The fishery for white steenbras *Lithognathus lithognathus* off the Cape Coast, South Africa, with some considerations for its management. *South African Journal of Marine Science* **13**: 1-14

Acknowledgements

- We are grateful to the NRF, SAIAB and Rhodes University for funding various aspects of this research
- Ann Hecht for collecting daily mouth data