21st International RIVER SYMPOSIUM

Measuring productivity of Australian tropical estuaries using standing stock analysis

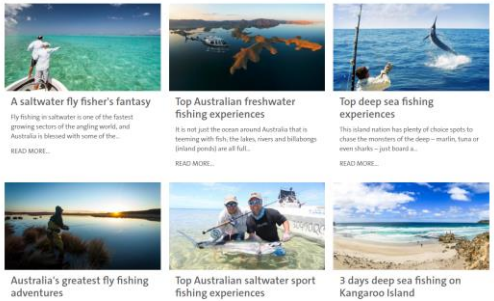
Jakob Fries, Marcus Sheaves, Ronnie Baker
James Cook University, Queensland

Value of tropical rivers and estuaries

- Regulating Services
- Cultural Services
- Supporting services

Values in northern Australia

Great Fishing experiences and itineraries



Hefty Hinchinbrook Barra Worth the Drive

Rob Wood | First Published: October 2011

The winter weather may test the patience and passion of many anglers, however the thought of landing thick winter barra is just too tempting for me!

Every year, along with my fishing buddy Craig Griffith and my son Tommy, I search for an area that will produce some quality fish and set up camp for a few days. It's always tough to convince my wife that we need to go and catch some barra in the winter as it's usually the time we get all the maintenance done around the house.

Young Tommy with a whopping barra by targeting snags just out from the bank.

John Rorvik was thrilled to land a $10,000 barramundi Pictures: KERI MEGELUS

LIFESTYLE

Lucky No. 13 for Million Dollar Fish angler

The first million dollar fish has been caught.

On Mornings with Adam Steer

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Threats to tropical estuaries

Townsville Bulletin

Search

NEWS BREAKING TOWNSVILLE REGIONAL CRIME & COURT NATIONAL W

Thousands of dead fish in Ross River near the pontoon at Rossiter Park in

NEWS

Record fish kill stinks up Ros

LYDIA KELLNER, Townsville Bulletin
March 7, 2016 12:00am

Bill Sawynok inspects the fish kill at Woolwash yesterday. Picture: Allan Reinikka

LOCAL

Barramundi found dead after flood

Driven by raging torrents of oestrogen, these sex-crazed barramundi from the Burdekin Dam were attempting to get downriver during the March rain for a spawning frenzy in the mangroves.

NEWS

Sex-crazed barramundi attempt to get downriver during March rain for spawning frenzy in mangroves

Importance of valuation

- Accurate valuation improves management of ecosystem services and resources

- Facilitate the comparison of relative values between habitats, systems and regions

Productivity estimates

- Effectively value the contribution of a habitat & ecosystem or region to local fisheries

Productivity estimates

- Current estimates limited to few species
- No estimates at system/within system scale
- No multi-species estimates

- Differences between and within systems are likely but unknown

Data requirements

- Species information
- Growth/mortality rates
- Recruitment/emigration rates
- Size frequency distribution
- Standing stock of the population
- Areal extent of the population

Picture here

Data collection

- Traditional methods such as beam trawls and drop samples are impractical, inefficient and unreliable in tropical estuaries

Alternate capture methods?

Measuring growth rates

Project objectives

1. Develop a method for producing accurate and reliable estimates of standing stock biomass for fish and prawns in tropical estuaries

2. Investigate the potential for standing stock measures to produce proxy estimates of productivity and other population metrics

3. Investigate the scale at which productivity and population metrics can be reliably estimated using the standing stock method

Deliverable data

- Growth & mortality rates
- Biomass contribution
- Recruitment/emigration phases and times
- Length-weight relationships

Capture method

- Cast nets deployed from boats during low tides
- 2.8m monofilament drawstring net – 5mm mesh
- Deployed haphazardly along edge habitats e.g. banks and mangrove forest boundaries

Site

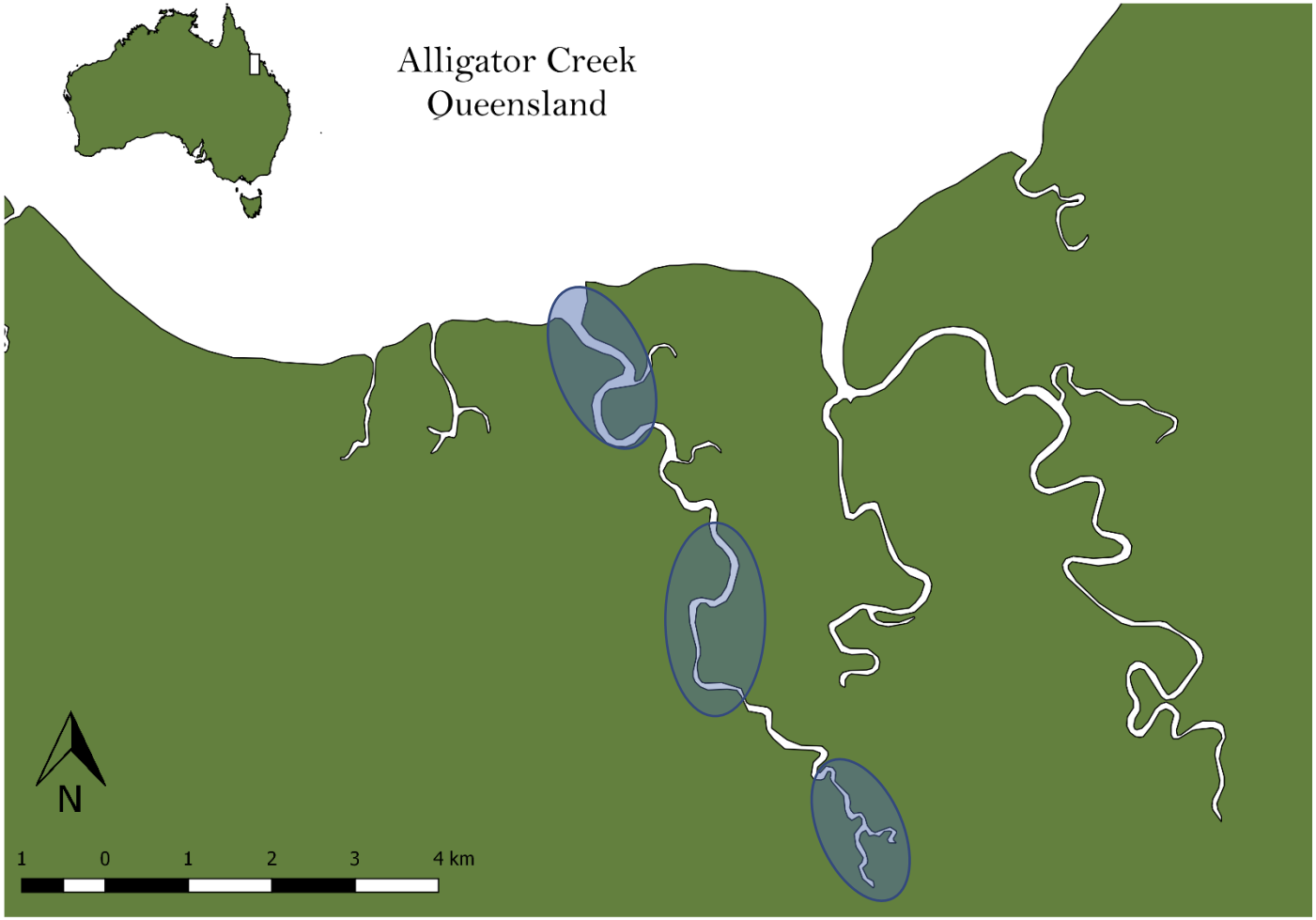
- Alligator Creek
- 20km east of Townsville

Reaches

- Upstream
- Midstream
- Downstream

Replicates

- fortnightly, stratified seasonally
- 30 replicate nets per reach

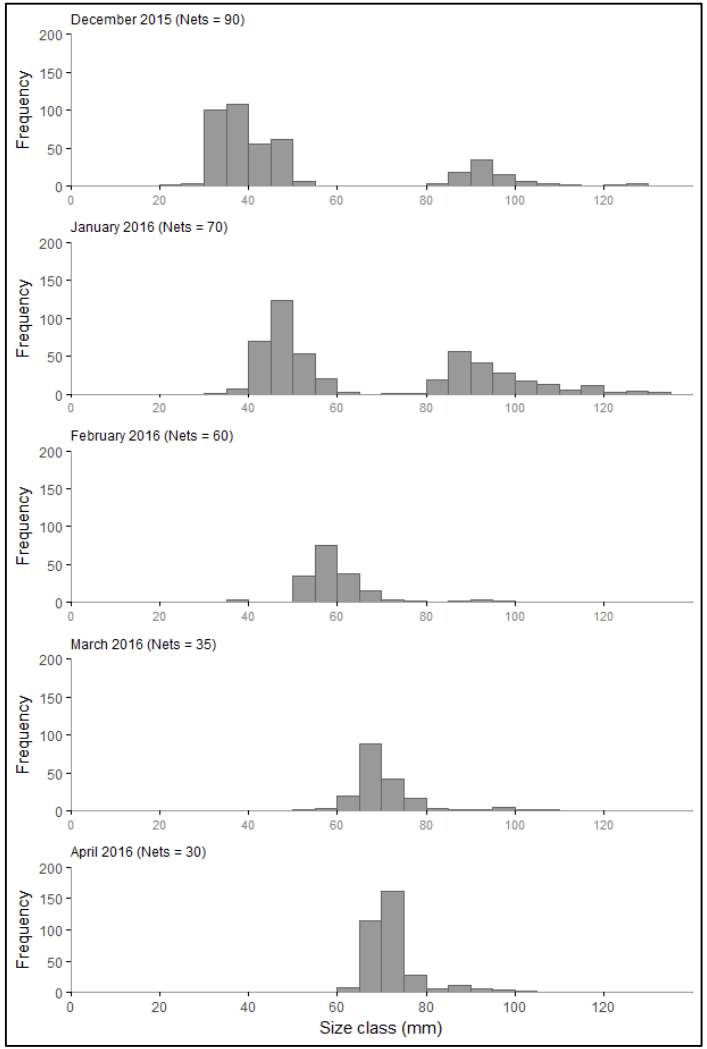


Capture method

Capture method

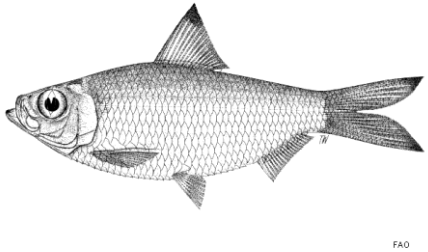
Results

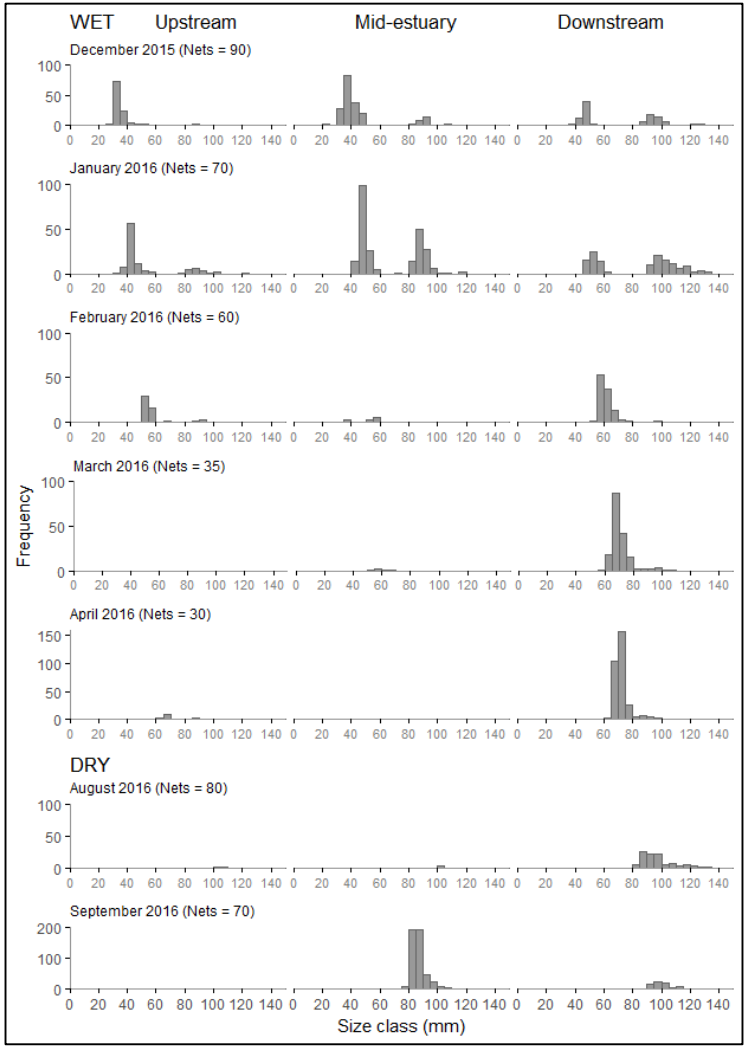
Results



Estuary scale cohort analysis

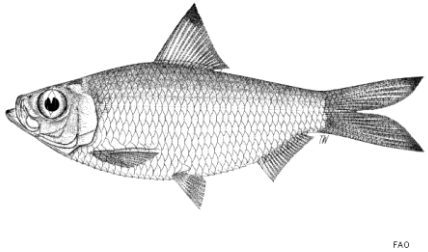
length frequency distribution for the population of Southern Herring (*Herklostichthys castelnaui*) sampled from Alligator Creek from December 2015 to April 2016.

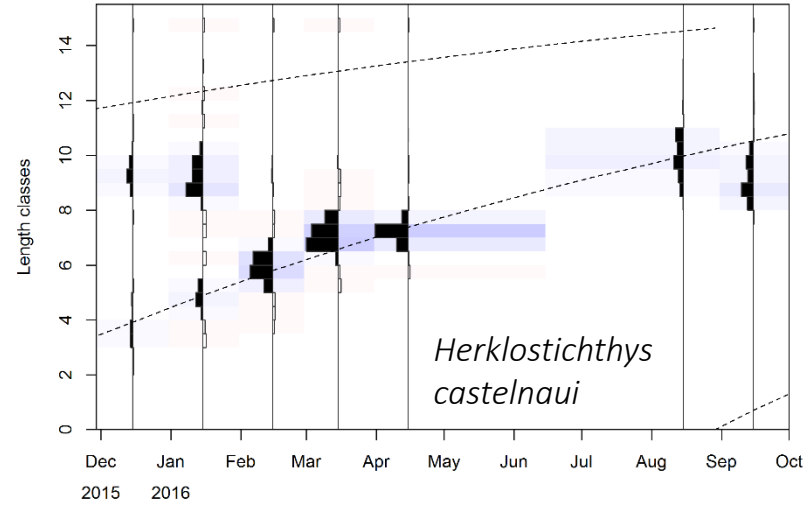




Reach scale cohort analysis

length frequency distribution for the population of Southern Herring (*Herklostichthys castelnaui*) sampled from Alligator Creek from December 2015 to April 2016.

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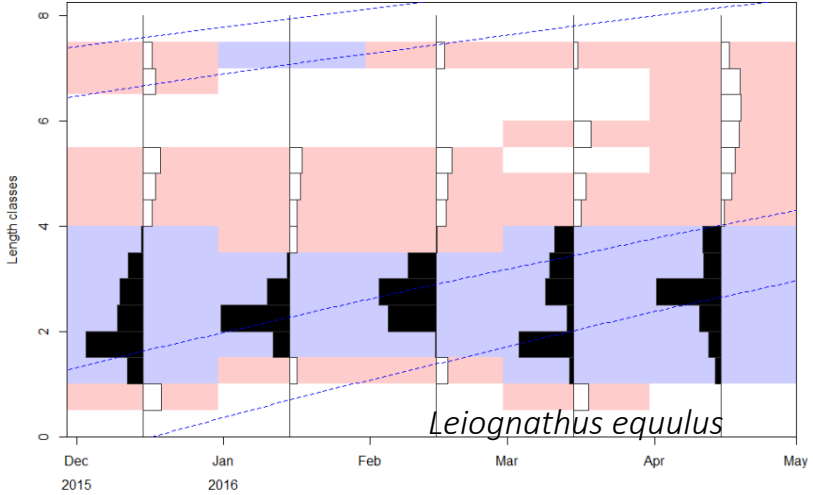
Herklostichthys castelnaui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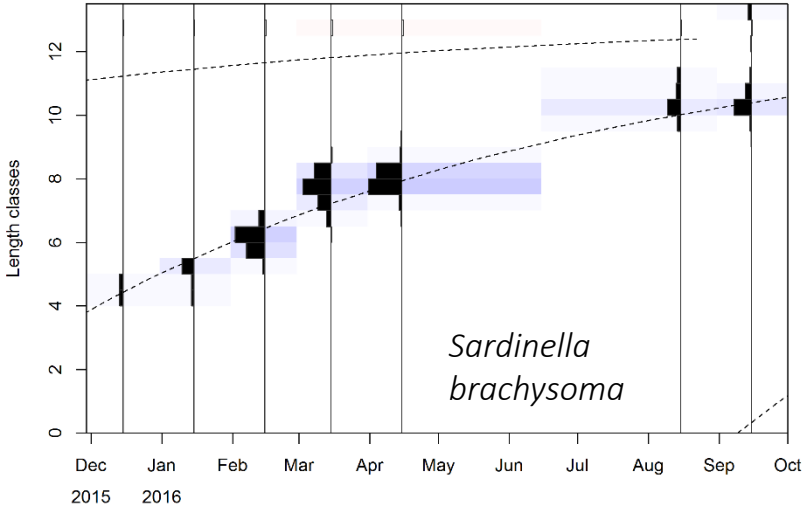
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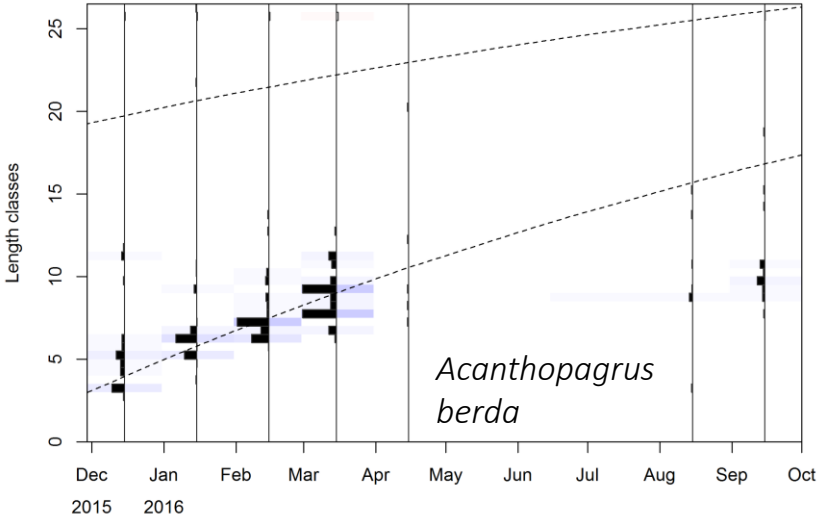
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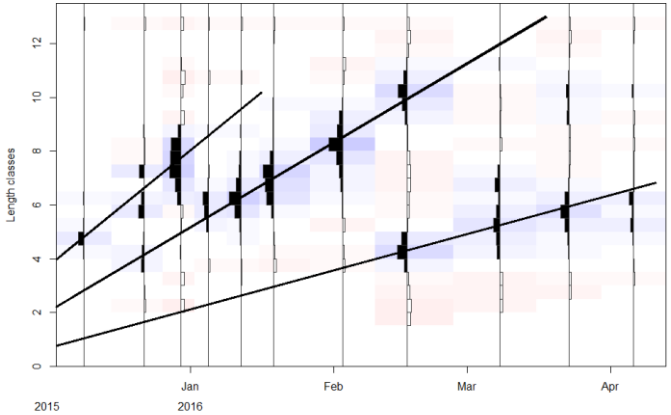
2016
Acanthopagrus berda

Results

- Three species successfully estimated growth rates in all reaches, these were also the most common species
- Greatest growth rates observed during Wet season
- Growth rates for some species varied within seasons



Conclusions

- Comparisons of larger scales e.g. between estuaries possible for many species
- Standing stock method requires less effort than traditional methods, and works for multiple species
- Standard method applicable to a range of species and habitats
- Further replication will allow spatial/temporal comparisons

Further research

- Mortality estimates using length-based methods
- Recruitment
- Emigration (stock export)
- Comparisons between reaches
- Productivity estimates

References and acknowledgements

Acknowledgements

- Marcus Sheaves, Ronnie Baker, John Brodie, Ross Johnston, Estuary and Coastal Wetland Ecosystems Research group, Cleveland Palms Estate, TropWATER

Images

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Questions?

TropWATER CENTRE FOR TROPICAL WATER AND AQUATIC ECOSYSTEM RESEARCH

Contact details

Email: Jakob.fries@my.jcu.edu.au