Management considerations for estuarine fishery species, from acoustic telemetry

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So what did we know 10 years ago?

- Estuarine dependence?
- Marine-estuarine connectivity?
- Proportion of time spent in estuaries?
- Proportion of fish that go to sea?
- Whether or not species show differences?
- Whether or not behaviour differs from one estuary to another?
Acoustic telemetry methods
Study estuaries

1. GREAT FISH
2. EAST KLEINEMONDE
3. KOWIE
4. KARIEGA
5. SUNDAYS
6. GOUKOU
<table>
<thead>
<tr>
<th>Species</th>
<th>Estuary</th>
<th>% of fish that went to sea</th>
<th>Mean % of time spent in estuary</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dusky kob</td>
<td>Great Fish</td>
<td>72</td>
<td>87</td>
</tr>
<tr>
<td></td>
<td>Sundays</td>
<td>40</td>
<td>97</td>
</tr>
<tr>
<td>Leervis</td>
<td>Goukou</td>
<td>76</td>
<td>32</td>
</tr>
<tr>
<td></td>
<td>Kowie</td>
<td>86</td>
<td>54</td>
</tr>
<tr>
<td>White steenbras</td>
<td>Kariega</td>
<td>30</td>
<td>91</td>
</tr>
<tr>
<td></td>
<td>Sundays</td>
<td>40</td>
<td>98</td>
</tr>
<tr>
<td>Spotted grunter</td>
<td>Great Fish</td>
<td>80</td>
<td>69</td>
</tr>
<tr>
<td></td>
<td>Kariega</td>
<td>56</td>
<td>88</td>
</tr>
</tbody>
</table>
Area use within estuaries

1) East Kleinemonde Estuary

2) Kariega Estuary

3) Sundays Estuary

Study area

Behavioural characteristics of juvenile white steenbras in a range of estuaries.
Proportion of time (mean %) vs Distance from mouth (% of estuary length)

- **Dusky kob**
  - Great Fish
  - Sundays
  - Kariega

- **Leervis**
  - Goukou
  - Great Fish
  - Kariega

- **White steenbras**
  - Sundays
  - Kariega

- **Spotted grunter**
  - Great Fish
  - Kariega
Proportion of time (mean %)

Distance from mouth (% of estuary length)

Great Fish

Goukou

Sundays

Dusky kob

Kowie

Sundays

White steenbras

Kariega

Great Fish

Kariega
Proportion of time (mean %)

Distance from mouth (% of estuary length)

- **Great Fish**
  - Sundays: 40%
  - Kariega: <1%

- **Goukou**
  - Sundays: 56%

- **Kowie**
  - Sundays: 77%

- **Kariega**
  - Sundays: 11%
  - Great Fish: 35%
  - Kariega: 89%
Proportion of time (mean %)

Distance from mouth (% of estuary length)

Great Fish
- Sundays: 60%
- Kariega: >99%

Goukou
- Sundays: 65%
- Great Fish: 44%

Kowie
- Sundays: 65%
- Kariega: 11%
Dusky kob

DEPARTURE
12:00 AM

RETURN
12:00 AM
Long-term persistence - Leervis

DISTANCE FROM MOUTH (KM)

TEMPERATURE (°C)

AUTUMN

SPRING

Daily position
Esttemp
Rivertemp

JAN
FEB
MAR
APR
MAY
JUN
JUL
AUG
SEP
OCT
NOV
DEC
JAN

Long-term persistence
Leervis
Long-term persistence - Leervis

![Graph showing long-term persistence of Leervis fish ID across different months. The graph displays the number of fish IDs for each month from January to December. The distribution is uneven with higher values in certain months like December.](image)
Mortality

- 24%
- 7%
- 5%
- 56%
So what do we know 10 years later?

- Estuarine dependence
- Marine-estuarine connectivity
- Proportions of time spent in estuaries
- Proportions of fish that go to sea
- That species do show differences
- That behaviour can differ from one estuary to another, even within a species
- High use areas for area closure
- Cyclical movement patterns of each species
- Mortality
Thank you