Residency, movement, migration and the genetic stock structure of an endemic South African sparid, the black musselscracker *Cymatoceps nasutus*

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INTRODUCTION

- Endemic South African sparid
- Major component of the recreational (shore- and boat-angling) fishery
- Life history makes them vulnerable to exploitation
- CPUE trends reflect a severe stock decline over the last two decades, despite size and bag limits
- Information on the movement ecology and genetic structure of the stock were identified as critical gaps for the management of the species

**AIM:** To examine patterns of movement and connectivity along the South African coast by using (i) conventional dart tagging and recapture information, and (ii) mitochondrial control region and nuclear S7 intron I DNA sequence data

RESULTS

### Movement

- High levels of residency for juveniles and sub-adults
- Adults move greater distances
- Smaller individuals hold smaller home-ranges
- Large easterly displacements indicate a possible unidirectional migration up the coastline, where some individuals settle for the remainder of their lives

<table>
<thead>
<tr>
<th>Distance moved (km)</th>
<th>Number recaptured</th>
<th>Mean size (mm FL)</th>
<th>Mean ages (years)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 – 1</td>
<td>164</td>
<td>573 ± 109</td>
<td>5.7 ± 3.4</td>
</tr>
<tr>
<td>&gt; 1 – 10</td>
<td>10</td>
<td>414 ± 74</td>
<td>6.7 ± 2.2</td>
</tr>
<tr>
<td>&gt; 10 – 100</td>
<td>8</td>
<td>388 ± 117</td>
<td>6.1 ± 3.5</td>
</tr>
<tr>
<td>&gt; 100</td>
<td>7</td>
<td>650 ± 58</td>
<td>14.8 ± 2.7</td>
</tr>
</tbody>
</table>

The differentiation of the Western Cape could be attributable to the development of a temperature barrier, known as the cold-ridge along the southern coast of South Africa. Despite this, data suggest that a single-stock mode is appropriate for management of the species. The high level of residency shown by black musselscracker has contributed to their localised depletion and decline, but also suggests that they can be effectively protected by suitable Marine Protected Areas. Larger scale movements of adults, coupled with the movement of larvae are sufficient to maintain genetic homogeneity, and should be accommodated in a reserve network.

### Genetics

- No significant population structure
- Gene flow is not limited by geographic distance
- Gene flow is largely unaffected by oceanographic barriers and known biogeographical boundaries
- Western Cape showed moderate to substantial differentiation for both markers

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