

Can partial estuarine area protection reduce the vulnerability of a highly mobile fishery species?

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Leervis *Lichia amia* is an estuarine-dependent recreationally important fishery species from False Bay to northern KwaZulu-Natal, South Africa. Since estuaries represent critical habitats in their life-history an understanding of their movements and area use patterns in estuaries is important for fisheries management. This project makes use of an expanded ATAP and OTN acoustic telemetry platform to determine whether a partial estuarine protected area provides sufficient protection for this highly mobile species.

An array of 11 data-logging acoustic receivers (VEMCO VR2Ws) is being used to assess the efficacy of the no-take Estuarine Protected Area (EPA) in the Goukou Estuary at Stilbaai, Western Cape (Figure 1). Seventeen juvenile leervis ranging between 233 and 608 mm (fork length) were surgically equipped with coded acoustic transmitters and, to date, have been monitored for eight months.

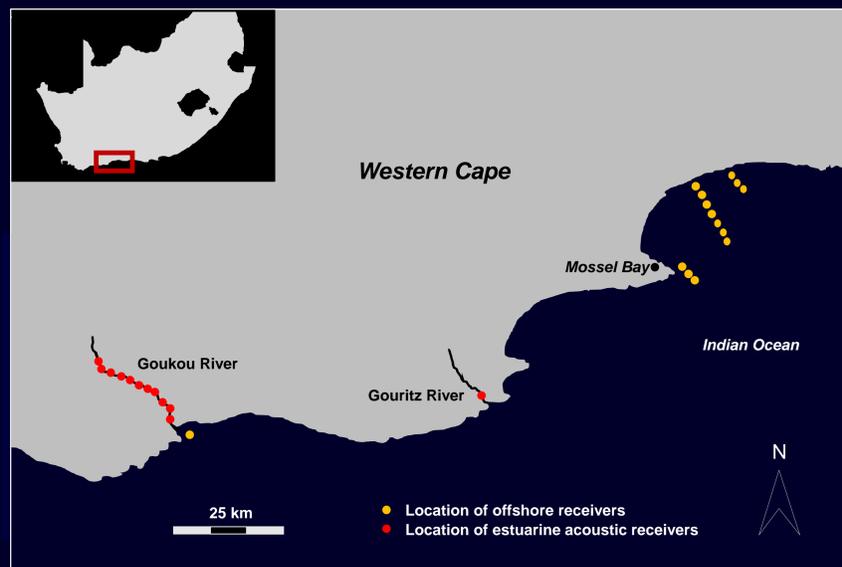


Figure 1: Map showing the locations of ATAP and OTN estuarine and offshore receivers along the Western Cape coastline of South Africa.

Additional receivers have been deployed in the adjacent marine environment as well as in the coastal zone of Mossel Bay (Figure 1), providing information on the extent, timing and duration of movements between the estuarine and marine environments. Temperature loggers have also been deployed to determine the influence of this environmental factor on fish movement patterns.



All tagged fish made extensive use of the entire estuary (Figure 2). The disproportionate amount of time spent at receivers 2, 3 and 5 is possibly an artifact of poor acoustic reception range caused by extensive sandbanks in these areas.



Figure 2: Image of the Goukou Estuary showing the position of the acoustic receivers (1 - 11) and the overall proportion of the time tagged leervis spent at each receiver (circles).

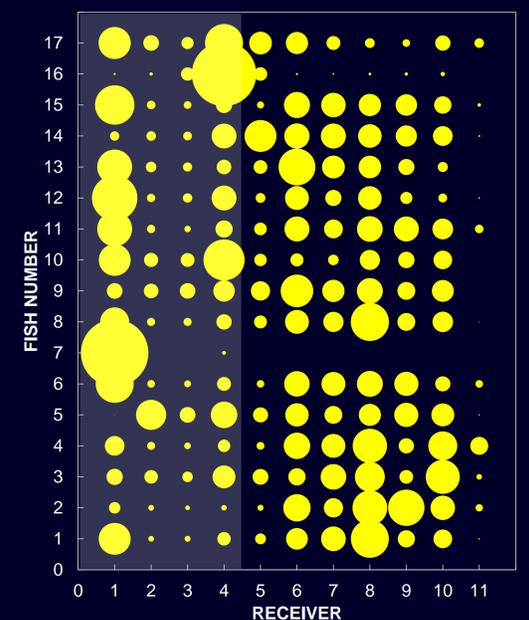


Figure 3: Bubble plot displaying the proportion of time tagged leervis spent at each receiver in the Goukou Estuary. The non-shaded area represents the EPA.

The Goukou EPA's boundary begins 4 km from the mouth and extends to the head of the estuary (16 km up), providing protection from fish and bait exploitation to approximately 75% of the estuary. Based on the proportion of time each tagged leervis spent at each receiver (Figure 3), it was determined that five individuals spent < 50% of their time (range: 0% to 36.7%) inside the EPA, while the remaining 12 individuals spent the majority of their time within the EPA (range: 59.2% to 95.2%). Despite being highly mobile in their nursery habitat, this study shows that partial estuarine protection is capable of reducing their vulnerability to capture in the local fishery. A complimentary acoustic telemetry study was initiated in the Kowie Estuary, Eastern Cape (approximately 620 km away). The information gained from these studies will provide information on the behavioural ecology of leervis and insights into the potential value of no-take EPAs as a fisheries management option for this species.

