

## 5.2 The Sardine Run

**Each winter the KZN South Coast is gripped by sardine fever. Huge shoals comprising millions of the silvery little fish enter KZN waters providing a feeding frenzy for predators and a spectacle not to be missed! Although the sardine *Sardinops sagax* also occurs in Australia, Japan, Chile, Peru and California, the grand scale of this annual sardine migration from the southern Cape waters to KZN appears to be unique.**

The earliest documented reports of the sardine run date back to the 1850s, and it continues to attract the attention of the public in the months of June to August each year. What gives rise to the sardine run and what the underlying biological reasons are, have been the subject of several studies which have proposed interesting theories and speculative answers over the years.

The winter run is a reproductive (not feeding) migration to KZN by part of the southern Cape sardine population. Once in KZN waters, the sardines spawn and their eggs and larvae drift down the coast to nursery areas on the Agulhas Bank off

the southern Cape. It is not clear what proportion of the population undertakes the migration, but those sardines that do migrate could be genetically distinct from the rest of the population. In other words, they have evolved to undertake the migration, and continue to do so because it increases their chance of reproductive success.<sup>1</sup> Thus, although the migration is instinctive, decisions are made by the sardines as to exactly where to spawn, based on chemical signals in the water “remembered” from when they were in their egg and larval stages.

There are two theories as to why the migration first started. One suggests that, during the last ice age when the sea was much cooler, sardines used to live permanently off KZN, but as the sea warmed the sardines were forced to move further south in order to stay in cool waters, and some of the population still returns to KZN to spawn.

The other theory is that South African sardines originally only occurred in the southern Cape, but for unknown reasons, a shoal of sardines was diverted away from the normal

An expectant crowd gathers around a recently netted catch of sardines on the KZN coast.



Photo: Fiona MacKay

spawning grounds on the Agulhas Bank and ended up in KZN, where extremely high reproductive success led to this migration being ingrained in their behaviour.

In relation to the overall South African stock, the sardine population that occurs from east of Port Alfred up to KZN is very small, with an annual biomass (total weight of sardines) estimated at around 30 000 tons<sup>2</sup> and not all of which actually enters KZN waters.<sup>3</sup> This is extremely small when compared to the annual biomass on the Cape south and west coasts, which is between 500 000 to 4 million tons.<sup>2</sup> Catches off KZN also contribute very little to the annual total allowable catch of South African sardines; on average around 400 tons, compared to the combined south/west coast annual catches of around 130 000 tons.

Nevertheless, although the KZN run is small in terms of biomass, it is believed to inject a substantial amount (~25% of the organic nitrogen) into the KZN marine environment,<sup>3</sup> which is generally poor in nutrients. It also generates a great deal of local interest amongst recreational fishermen, because of the fish predators which accompany the sardines.<sup>4</sup> The public too are enthralled by the spectacle of whales, dolphins and a myriad of gannets chasing the shoals,<sup>5</sup> and because it is an opportunity to collect some free sardines for the table. The run has substantial economic importance for a wide range of communities, which have developed a raft of activities associated with it.<sup>6;7</sup>

Although some years are perceived to have “good” or “bad” runs by members of the public or the beach-seine netters, this relates to whether or not the sardines came close inshore. In reality, the sardine run happens every year, but the size of the migration and its timing are determined by large-scale oceanographic processes, as discussed in *Section 2.3*. While the main water flow on the KZN South Coast and Transkei coast is from north to south, at times there is a current reversal, caused either by a giant eddy, which travels up the coast every 4-6 weeks, or by a meander down the Agulhas Current (called the Natal Pulse). In the months of June to August each year, the migrating sardines make their way up to an area off Waterfall Bluff in the northern Transkei, coming very close inshore to avoid the worst of the strong, warm, north-south Agulhas Current. Once there they are “trapped”; if they move out of the sheltered bay formed by the Bluff they will experience a strong current preventing their northward movement. However, if one of the southward-moving eddies or a Natal pulse passes by, this will cause an inshore current reversal, producing a south-north flow which can be several

kilometres wide. This is the opportunity for the sardines to follow the current further north into KZN waters. This is known as the Waterfall Bluff gateway theory,<sup>8</sup> and is all about oceanographic conditions and timing that allow shoals of sardines to burst through the “gate” and make it up to KZN. Once off KZN, other factors, particularly cool, clear water, calm seas and slow currents have been shown to be critical in influencing whether the sardines come close enough inshore for it to be considered a “good” sardine run.<sup>5</sup>

Of course, there is also the seldom-seen return migration back to the Cape; sardines are known to stay in KZN waters until at least November,<sup>9</sup> but on their way back they stay in much deeper, cooler water, using the prevailing north-south current flow to assist their passage home.

Gannet enjoying the sardine run feeding frenzy.



Photo: Jean Tresfon

