

## **Small Pelagics Spawner Biomass Survey is a GO!**

There was much excitement among the scientific staff on Thursday morning 18 October, when DAFF's FRS *Africana* cast off from Quay 500 to depart on the first major fisheries research cruise (in this case 52 days) for many months. The vessel had been under repair since she suffered bearing problems early in 2018. The Chief Scientists are Dagmar Merkle and Fannie Shabangu on the two cruise legs, accompanied by about 14 scientists on each leg, as well as two fishing masters. The main purpose of the cruise is to provide a scientific basis for the setting of sardine and anchovy TACs by estimating the spawning biomass of these two key species.

More detailed objectives of the cruise are:

### **Acoustic sampling**

1. Estimation of the biomass and population length structure of anchovy, sardine, round herring, horse mackerel and meso-pelagic fish off South Africa by means of echo-integration and midwater trawling.
2. Collection of data for the description of distribution and behavior patterns of commercially harvested epi-pelagic and meso-pelagic fish, and the influence of oceanographic variables on these.
3. Collection of target strength data for round herring and meso-pelagic fish.

### **Fish biological sampling**

1. Collection of biological data (length frequency distributions, sex and gonad maturity staging, fat staging, etc) on epi-pelagic and meso-pelagic fish species.
2. Collection of otoliths from sardine, anchovy and round herring for age determination studies.
3. Collection of sardine, anchovy and round herring for analysis of tetracotyle-type digenean parasite loads.
4. Collection of sardine for analysis of heavy metal concentrations and microplastic ingestion.
5. Collection of hydrated sardine (where available) for batch fecundity determination.
6. Collection of sardine gonads for histology samples
7. Collection of mesopelagic species (lanternfish *Lampanyctodes hectoris* and lightfish *Maurolicus walvisensis*) for determination of their feeding periodicity and daily ration.
8. Collection of pelagic gobies (*Sufflogobius bibarbatus*) for general biology studies.
9. Collection of any unusual or uncommon fish species for general biology studies.
10. Collection of jellyfish (*Chrysaora* and *Aequorea*) tissue for genetic analysis.
11. Collection of rare or unidentified specimens for Iziko (SA Museum).

### **Fish egg and environmental sampling**

1. Continuous Underway Fish Egg Sampling (CUFES) along all survey transects and collection of on-station CUFES and California Vertical Egg Tow (CalVET) net samples and hydrographic data (via a Conductivity, Temperature and Depth (CTD) instrument attached to the CalVET net) along 17 survey transects, to assess abundance and distribution patterns of ichthyoplankton of small pelagic and other fish species and to collect data on water column structure.
2. Collection of larvae of anchovy, sardine and round herring from CalVET net samples for trophic studies.
3. Deployment of a drift net on an *ad hoc* basis to collect eggs of mesopelagic fish species for determination of their specific gravity in a density gradient column.

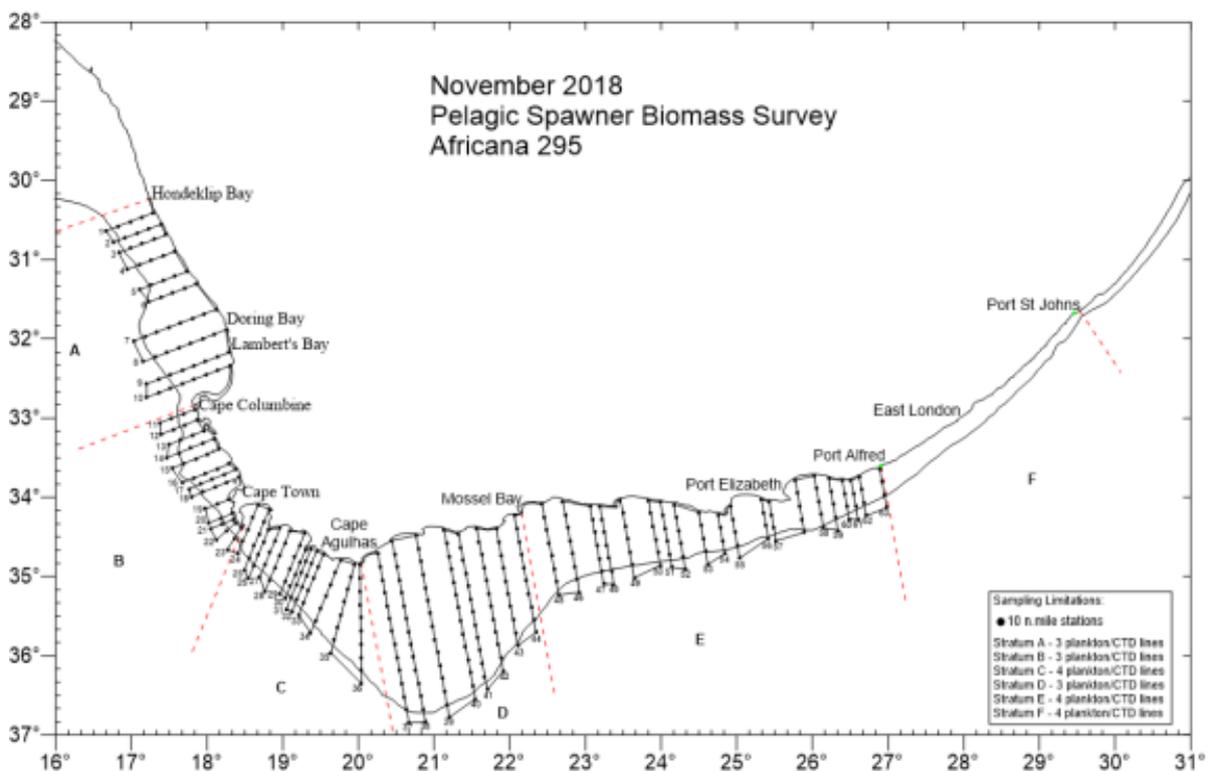
4. Collection of zooplankton samples along selected survey transects off the Western Agulhas Bank and the South Coast only.

The purpose of the above work is to obtain a snapshot of the environmental and food regime impacting the sardine, anchovy and other fish species around the coast.

Hydro-acoustic biomass estimation is a method that was actually pioneered in South Africa in the early 1980s and later perfected on the FRS *Africana*. SA scientists are still doing internationally cutting edge research on small pelagic fish and their population dynamics using this and other techniques. Very sensitive Simrad EK60 scientific echo-sounders and acoustic target strength measurements are used to estimate the density of fish along transects planned over the distribution of the fish around the SA coast (see the track chart to be used, below), and then trawl sampling of the fish species and statistical techniques are used to extrapolate these densities to spatially explicit biomass estimates. Vast amounts of data are logged, which can then be analysed in detail once the vessel returns to give the best possible estimates of spawning biomass.

The scientists work around the clock, 7 days a week, in hydro-acoustic, fish sampling and environmental sampling teams to produce this information, which is crucial for the small pelagic fishing industry. In fact, without the survey, it is difficult to set TACs and they must needs be conservative; so conservative that hundreds of millions of Rand would be lost through underutilization of the stocks.

We salute their hard work and dedication!



The track chart planned for the survey.