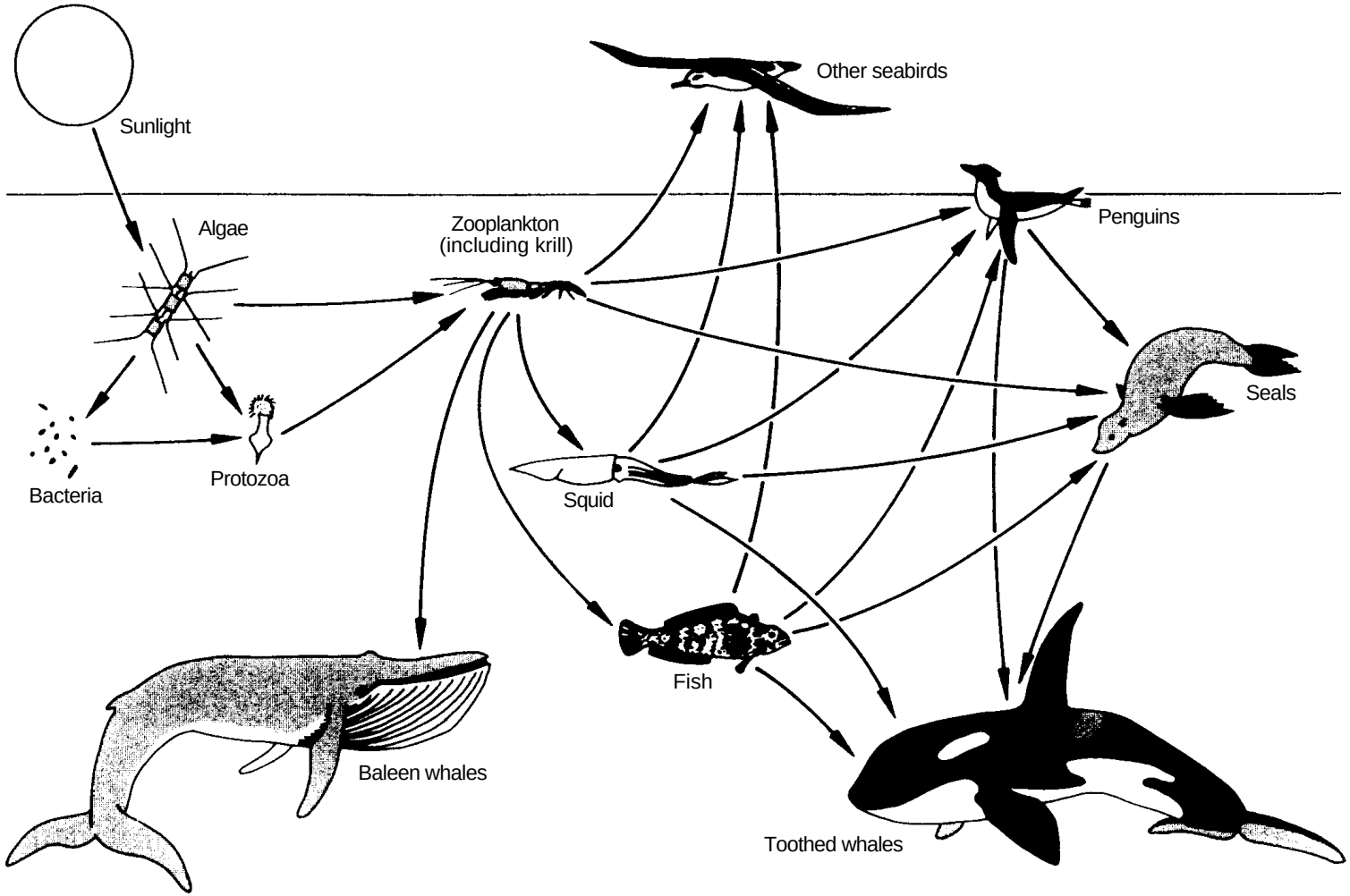

Figure 1: Simplified trophic relationships in the Southern Ocean.

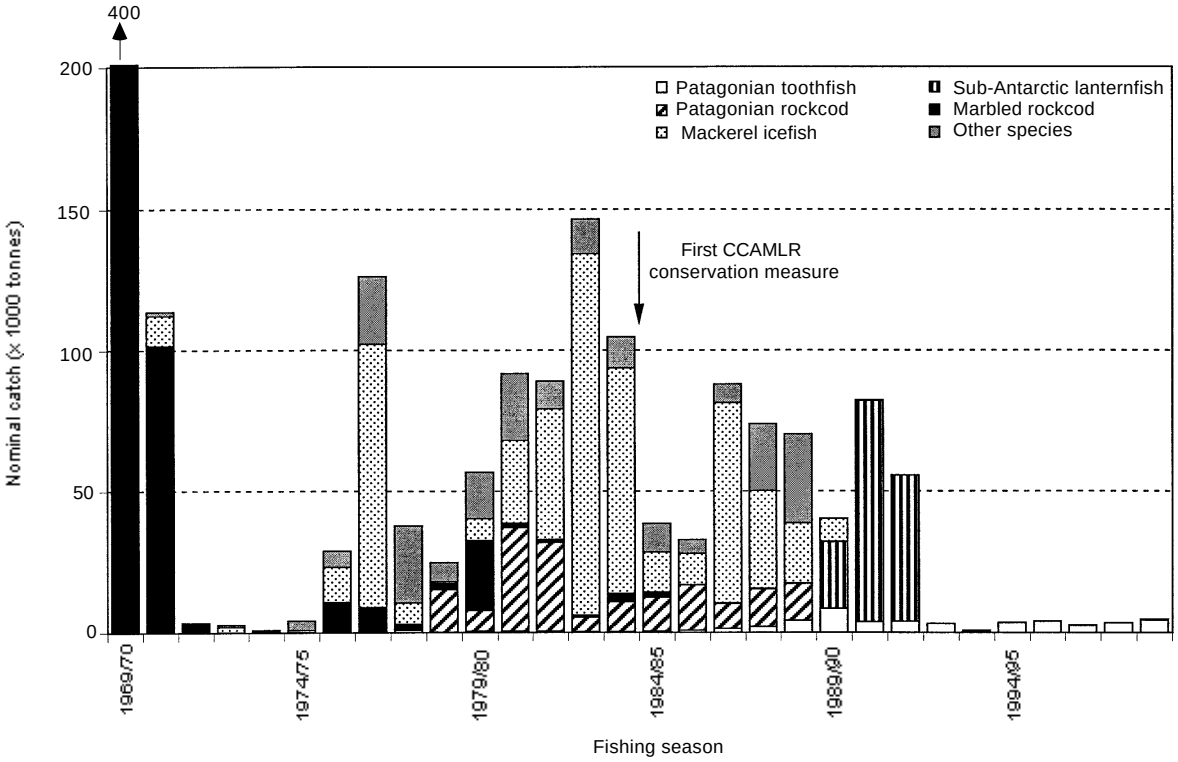

Figure 2: Nominal catch of finfish by species in Statistical Subarea 48.3 (South Georgia).

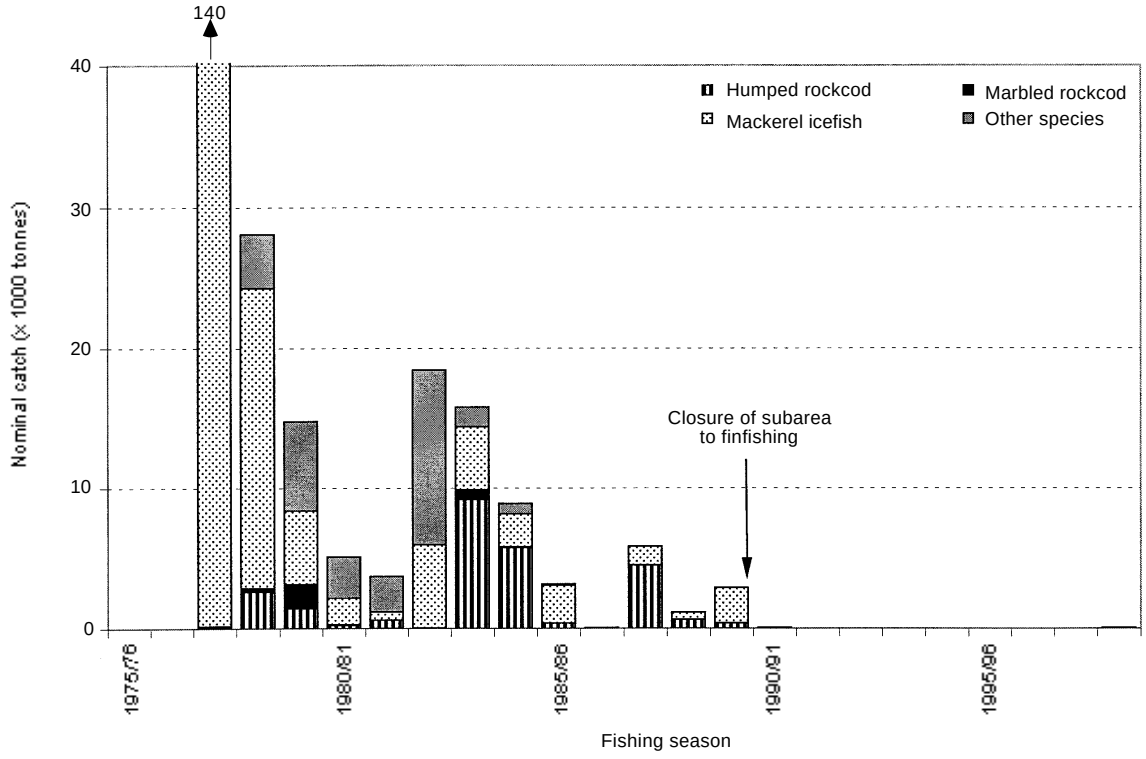

Figure 3: Nominal catch of finfish by species in Statistical Subarea 48.2 (South Orkney Islands).

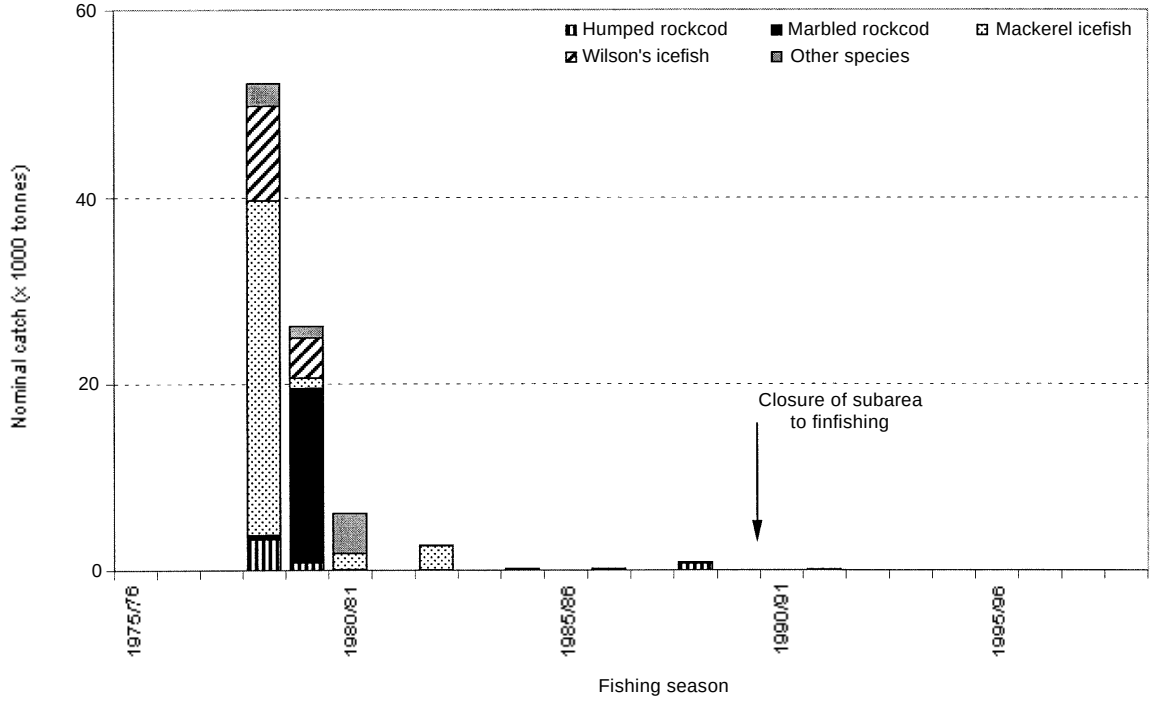

Figure 4: Nominal catch of finfish by species in Statistical Subarea 48.1 (Antarctic Peninsula region).

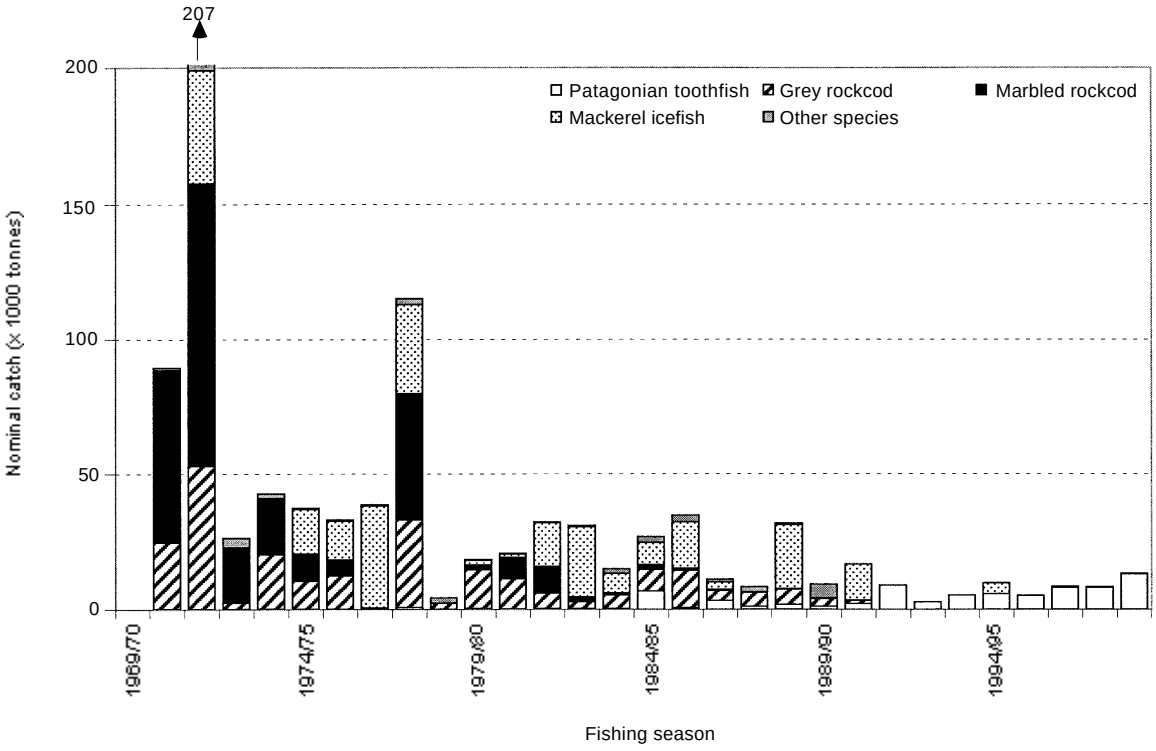

Figure 5: Nominal catch of finfish by species in Statistical Area 58 (Indian Ocean sector).

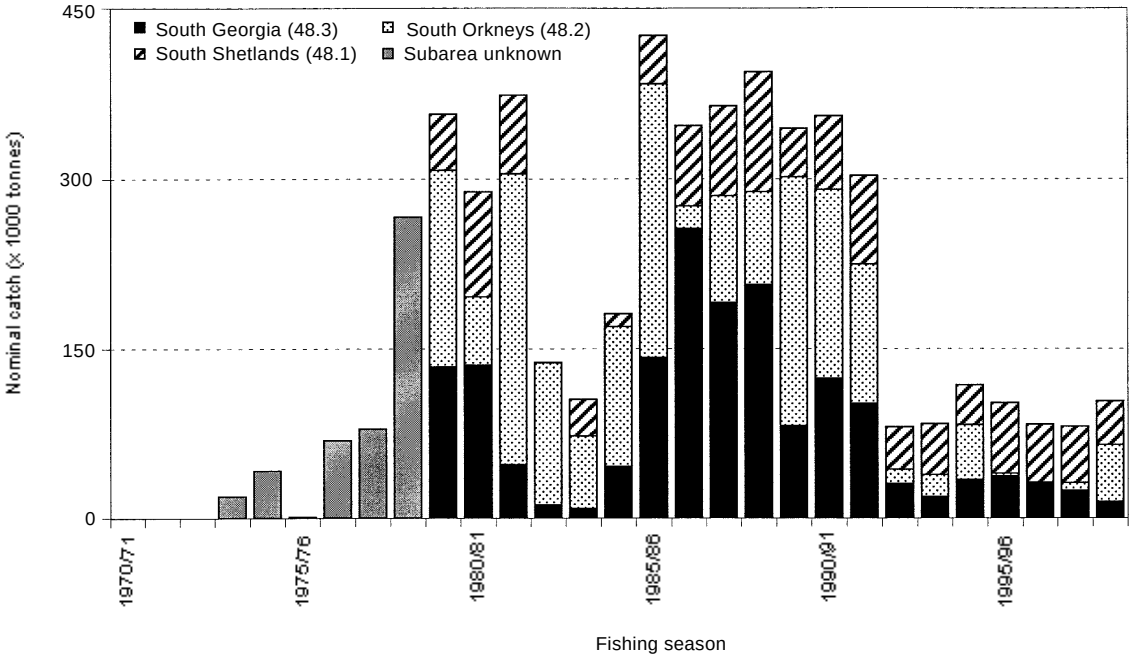

Figure 6: Nominal catch of krill (*Euphausia superba*) by statistical subarea in the Atlantic Ocean sector.

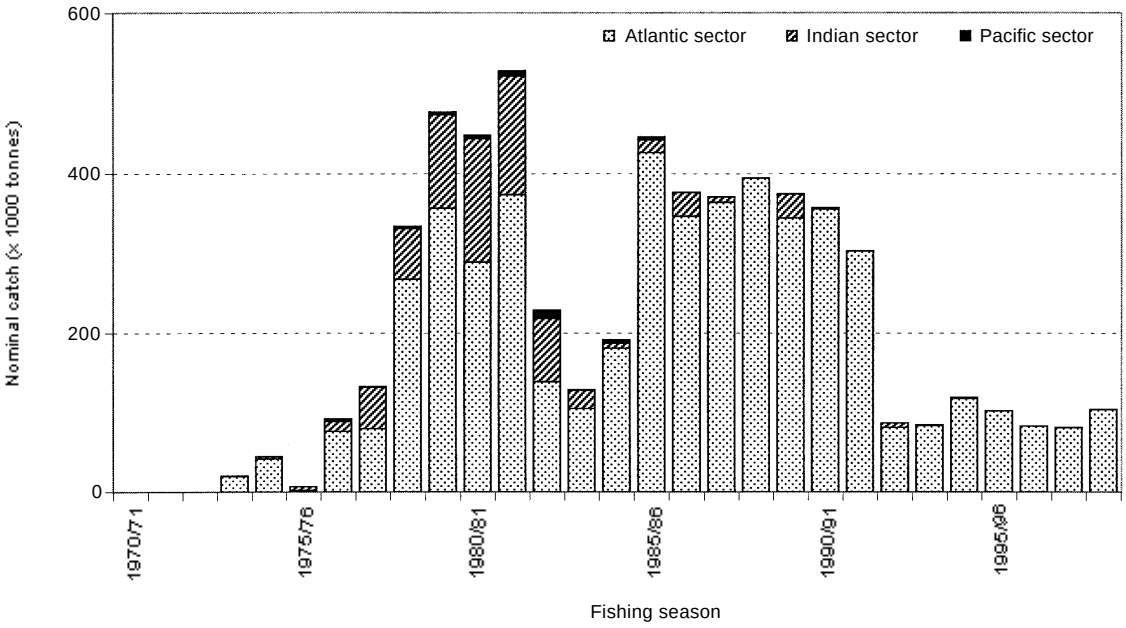

Figure 7: Nominal catch of krill (*Euphausia superba*) in the Atlantic Ocean (Statistical Area 48), Indian Ocean (Statistical Area 58) and Pacific Ocean (Statistical Area 88) sectors of the Southern Ocean.

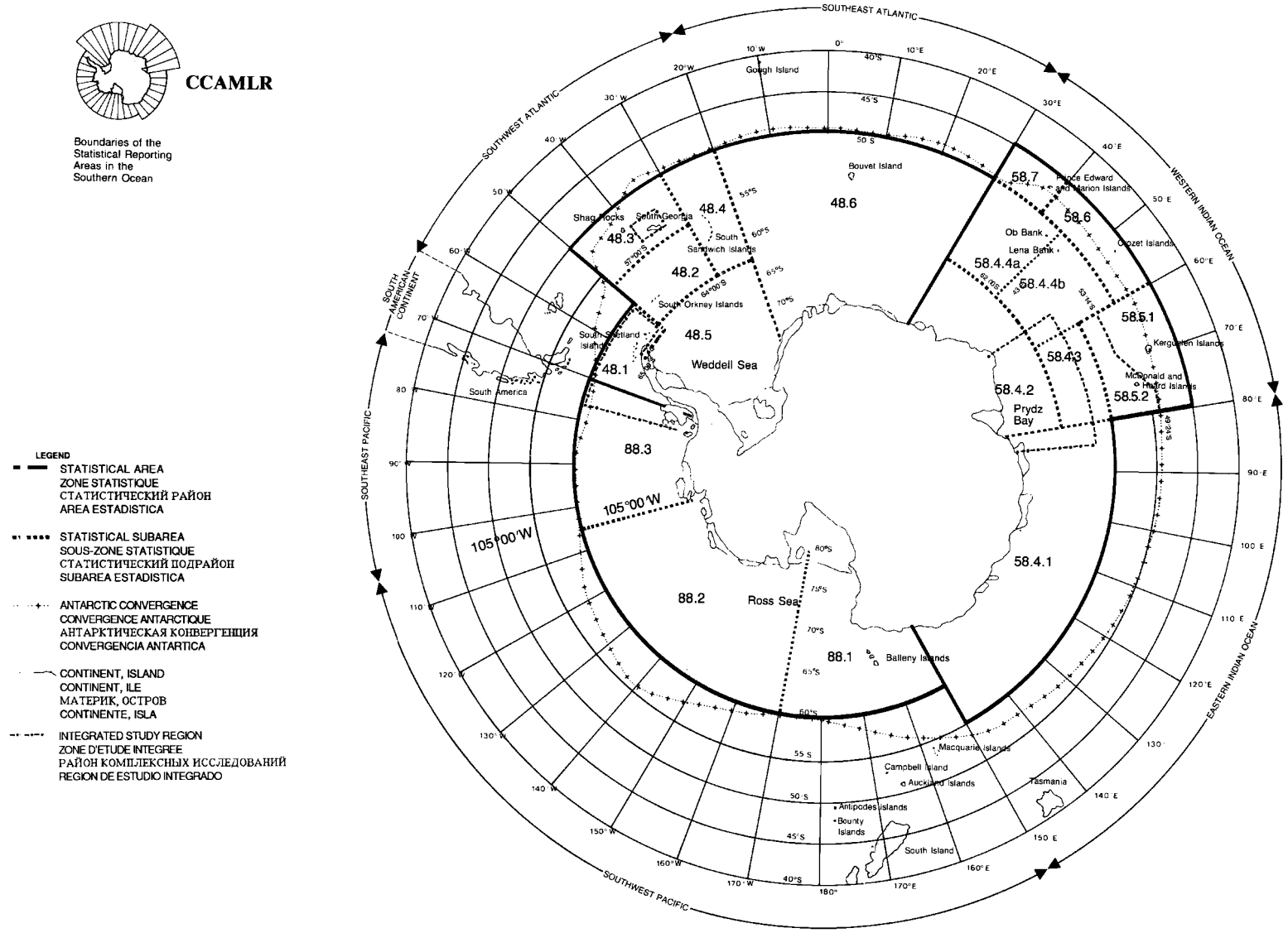

Figure 8: The area of the Convention on the Conservation of Antarctic Marine Living Resources (CCAMLR), with its statistical subareas and divisions.

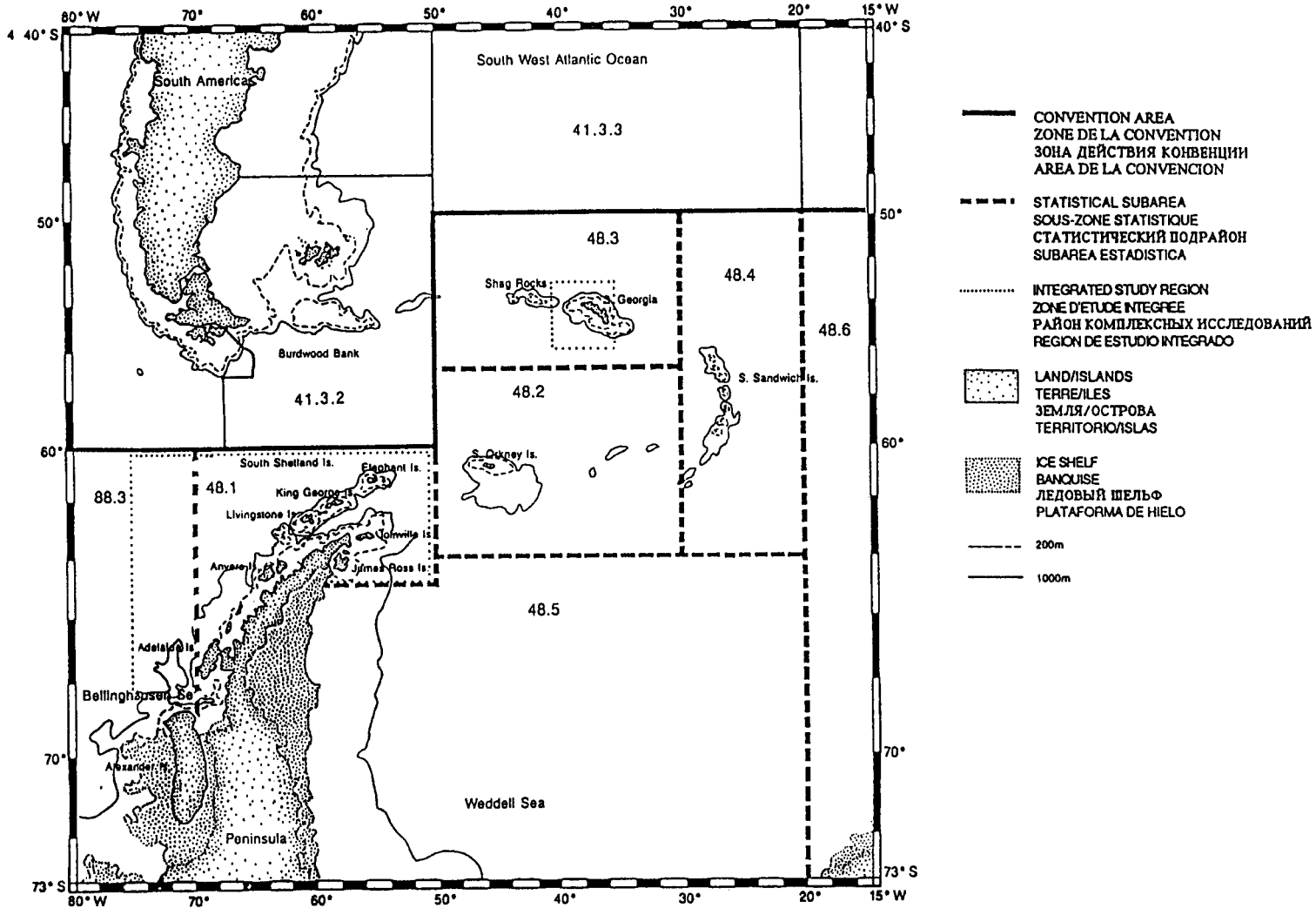

Figure 8 (continued) – Southwest Atlantic sector.

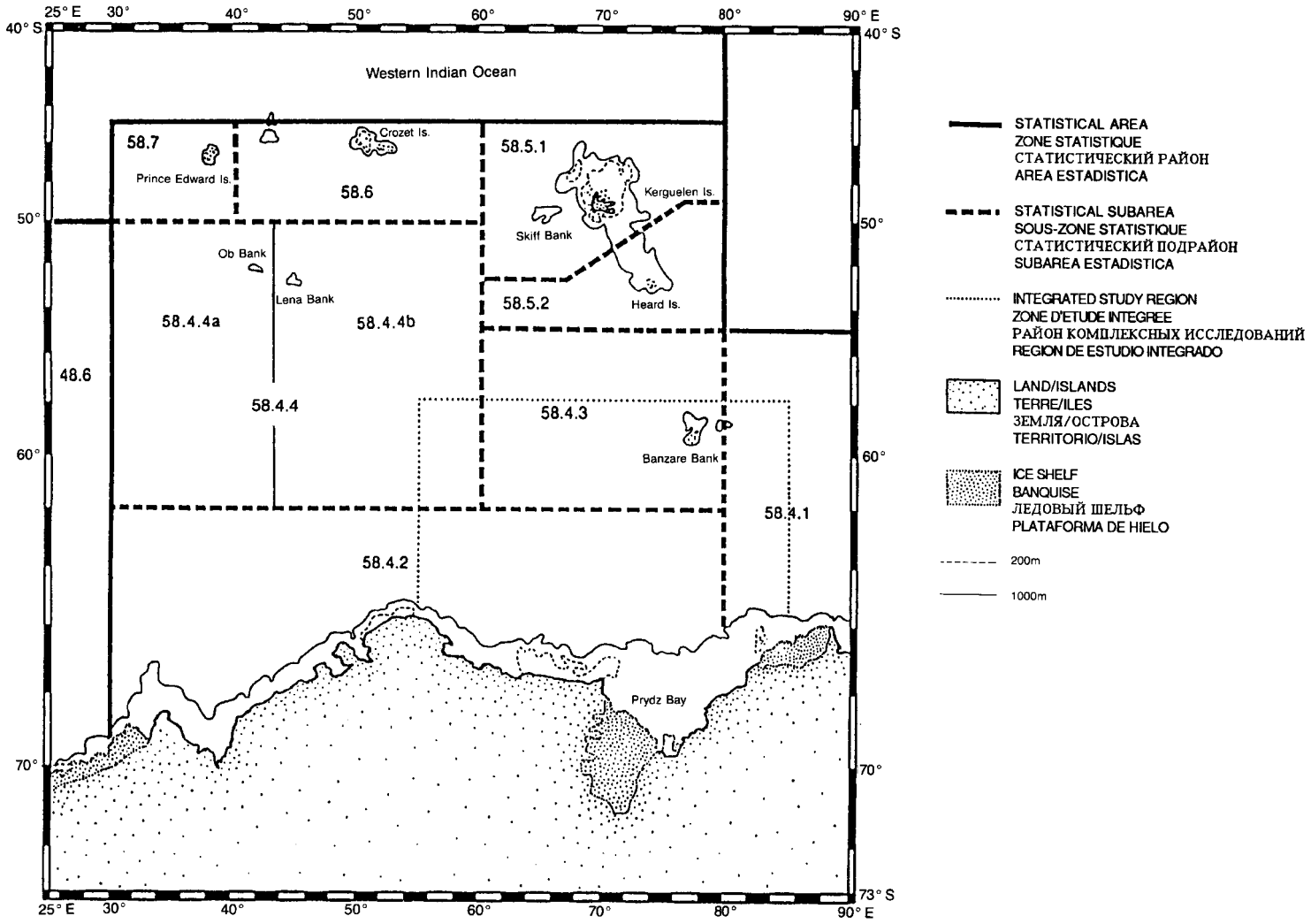

Figure 8 (continued) – Western Indian Ocean sector.

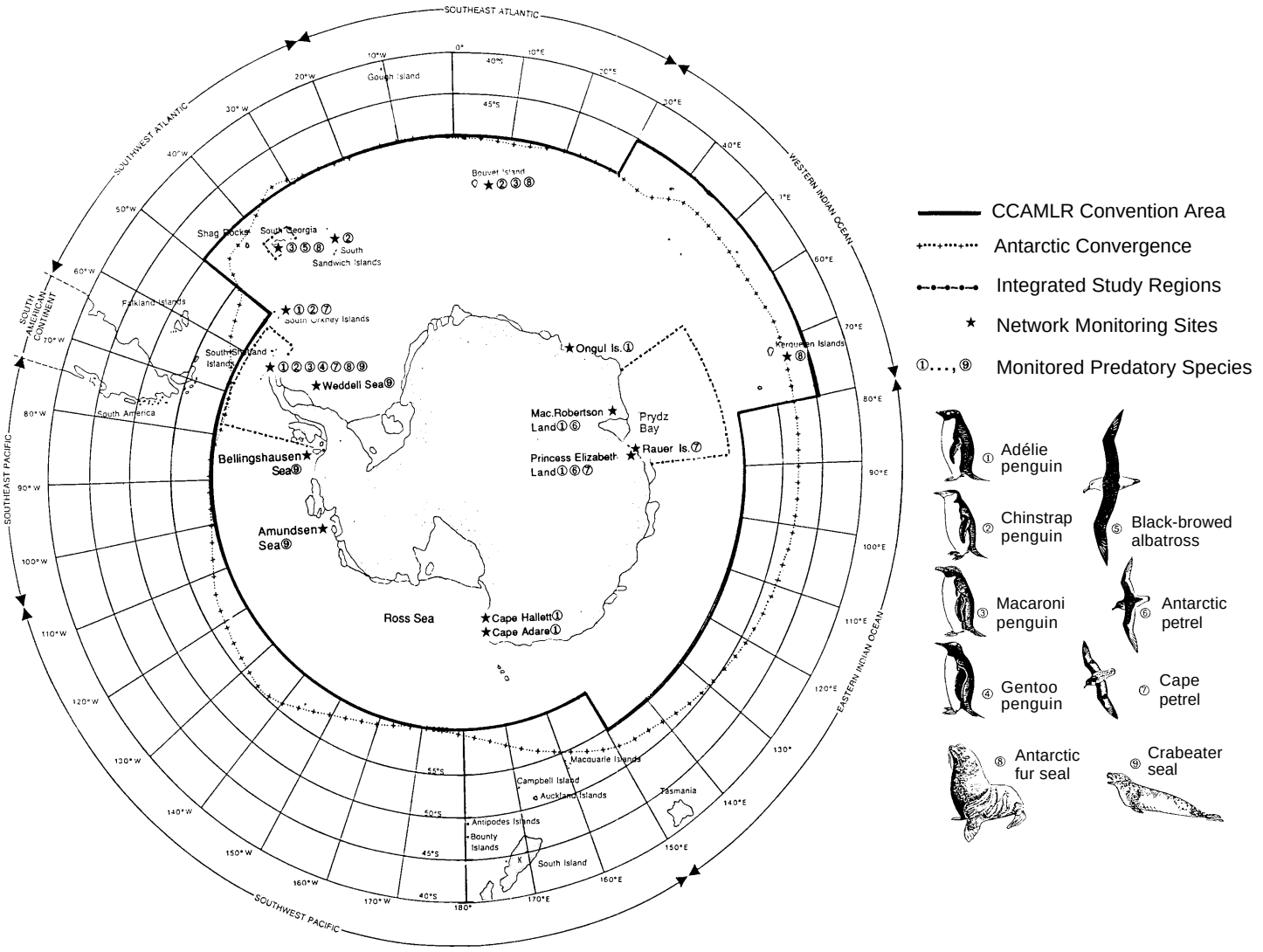

Figure 9: Integrated Study Regions (ISRs) and additional network study sites of the CCAMLR Ecosystem Monitoring Program (CEMP).

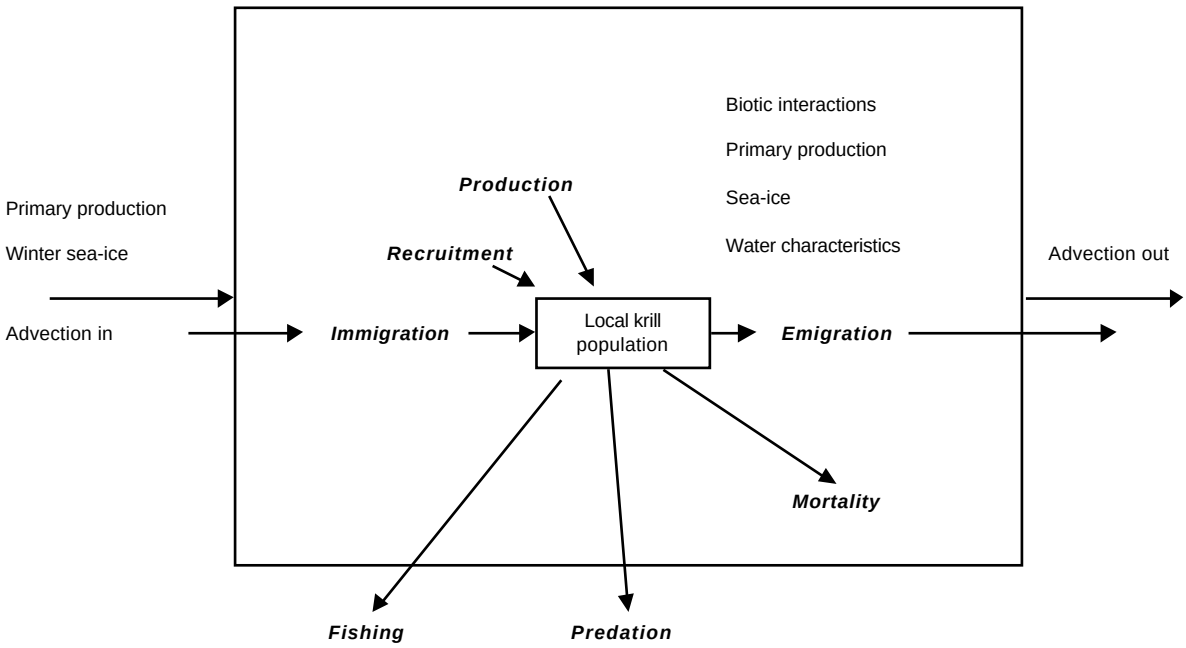

Figure 10: Environmental (biotic and abiotic) factors and processes determining local krill population distribution and abundance. The population processes are shown in bold italics.

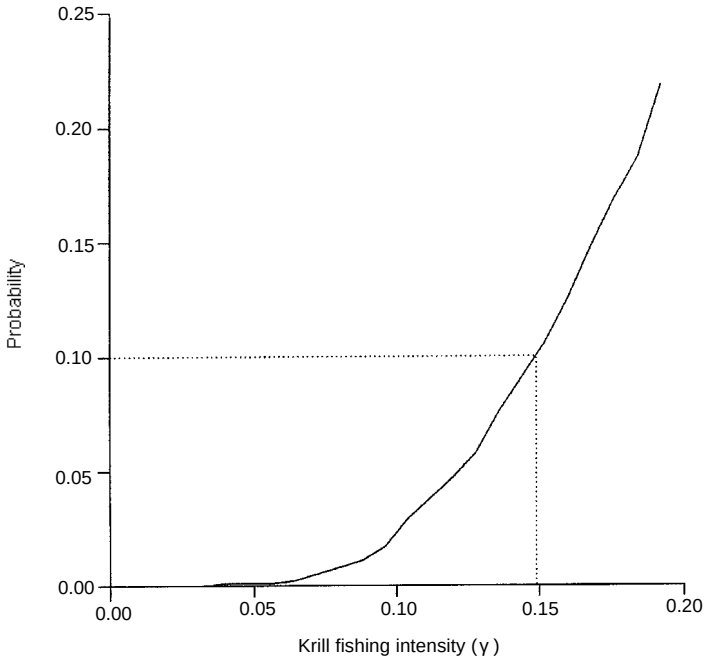

Figure 11: The probability that krill spawning biomass falls below 20% of its median level in the absence of fishing, plotted against the intensity of krill fishing as measured by γ. The factor γ is the number that multiplies a single survey estimate of biomass to provide the total allowable catch taken in each of the 20 years of the simulation period considered.

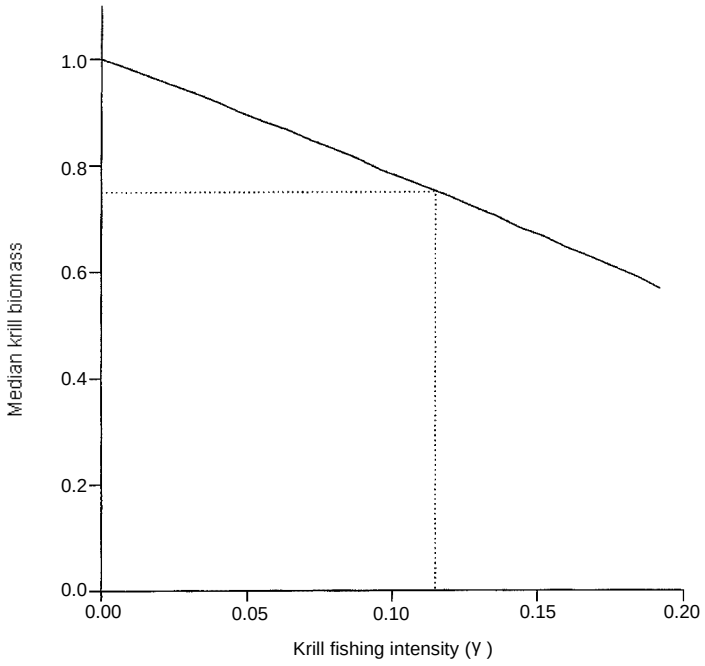

Figure 12: Median spawning biomass of krill at the end of the 20-year harvest simulation period, plotted against γ, where the biomass is shown as a fraction of the corresponding level in the absence of krill harvesting.

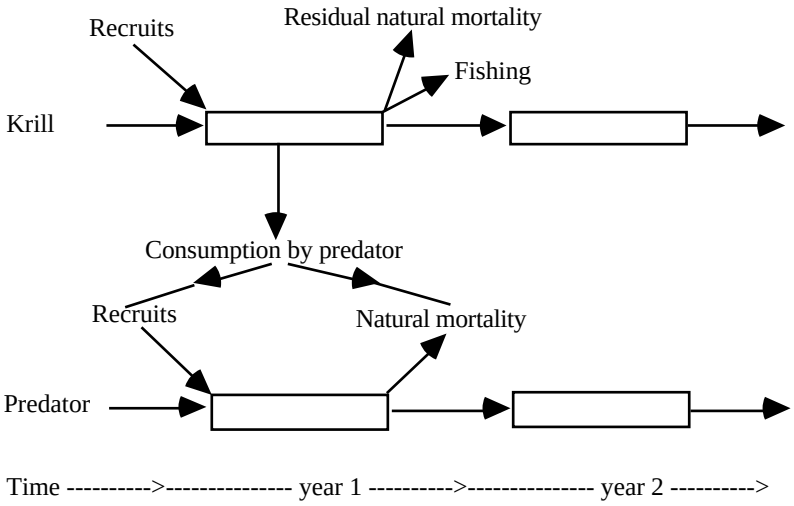

Figure 13: Schematic representation of a 'one-way' model in which fluctuations in the krill resource affect a predator population but not vice versa.

Figure 14: The relationships between adult and juvenile krill survival rates and availability.

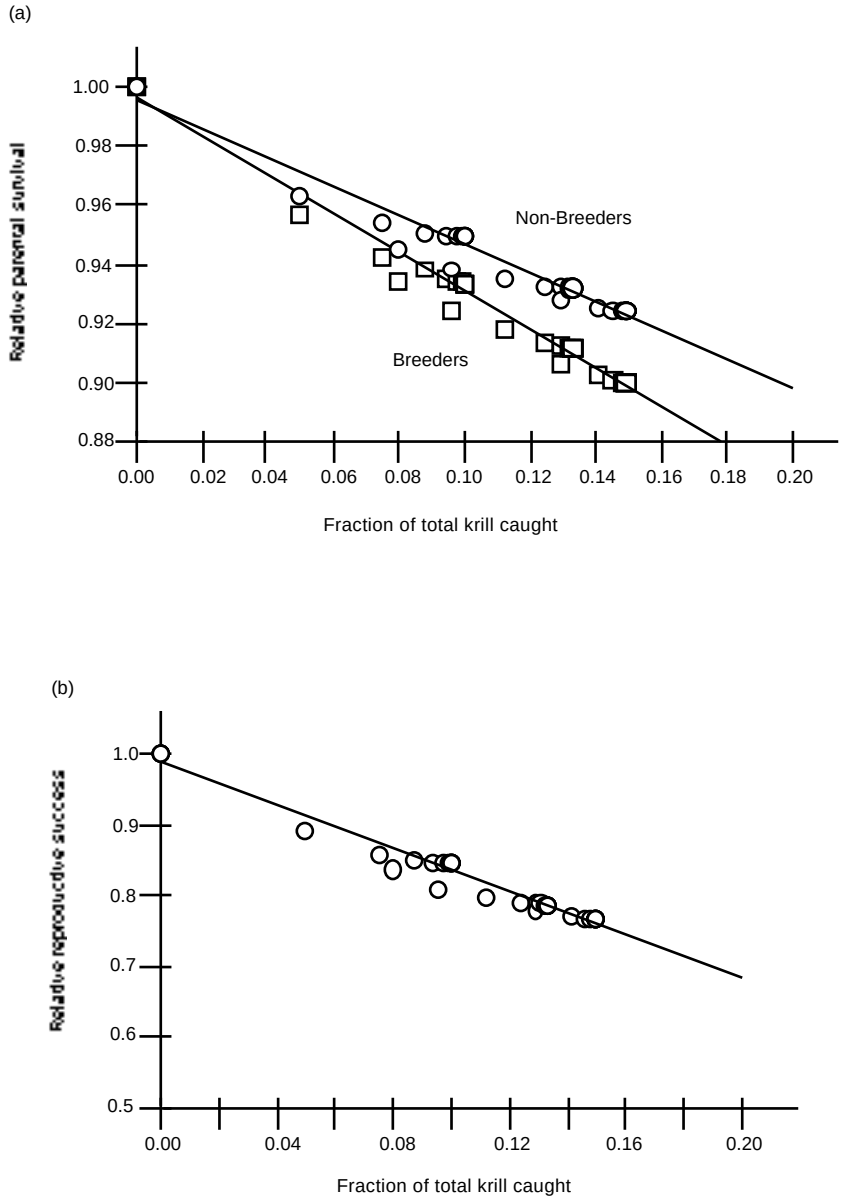

Figure 15: Regression lines showing that, relative (to the case of no fishery) (a) krill parental survival and (b) krill reproductive success depend on harvest. Variation in the fraction of krill taken by the fishery is generated by running the model for seasons of various lengths and different levels of total allowable catch.

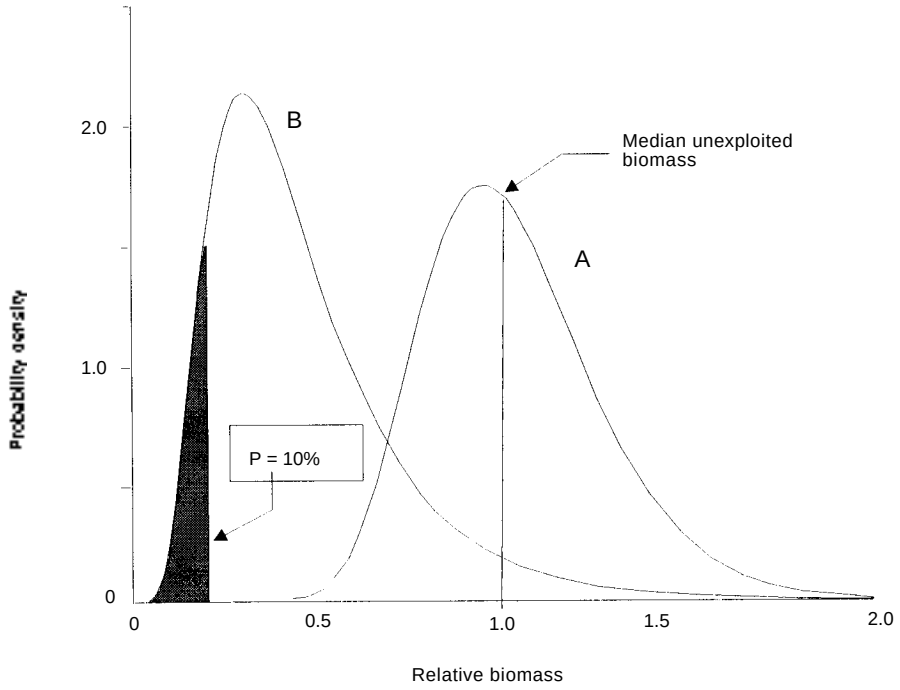

Figure 16: First part of the CCAMLR krill management decision rule:
Precautionary catch limits for krill are calculated by a population model to derive statistical distributions of the effects of fishing on krill abundance. These distributions take into account uncertainty about krill population dynamics by 'Monte Carlo' integration. The krill model is applied with demographic parameters drawn from statistical distributions that reflect our uncertainty about them. Further variability in the outcomes arises from variable recruitment, which is typical in relatively short-lived animals such as krill. The distribution marked A is the distribution of unexploited biomass from the model, which takes into account both the effects of variable recruitment and the uncertainty in the biomass estimate. Distribution B is the statistical distribution of the lowest population biomasses over 20 years of simulation. The 10th percentile of this distribution is used in one of the criteria for selecting an exploitation rate γ for setting precautionary catch limits for krill.

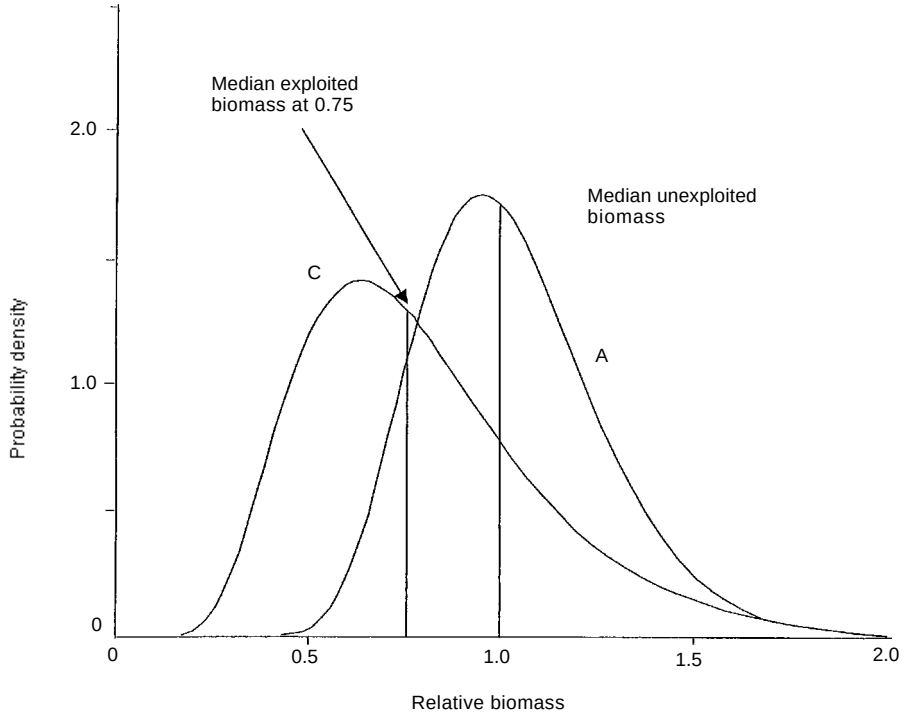

Figure 17: Second part of the CCAMLR krill management decision rule:
A second criterion for setting precautionary catch limits of krill is derived from the statistical distribution of krill abundance at the end of 20 years of exploitation. This is shown as distribution C. The exploitation rate is determined by choosing the rate that results in the median of C being at 0.75 of the median of A, where A is the statistical distribution for the unexploited biomass.

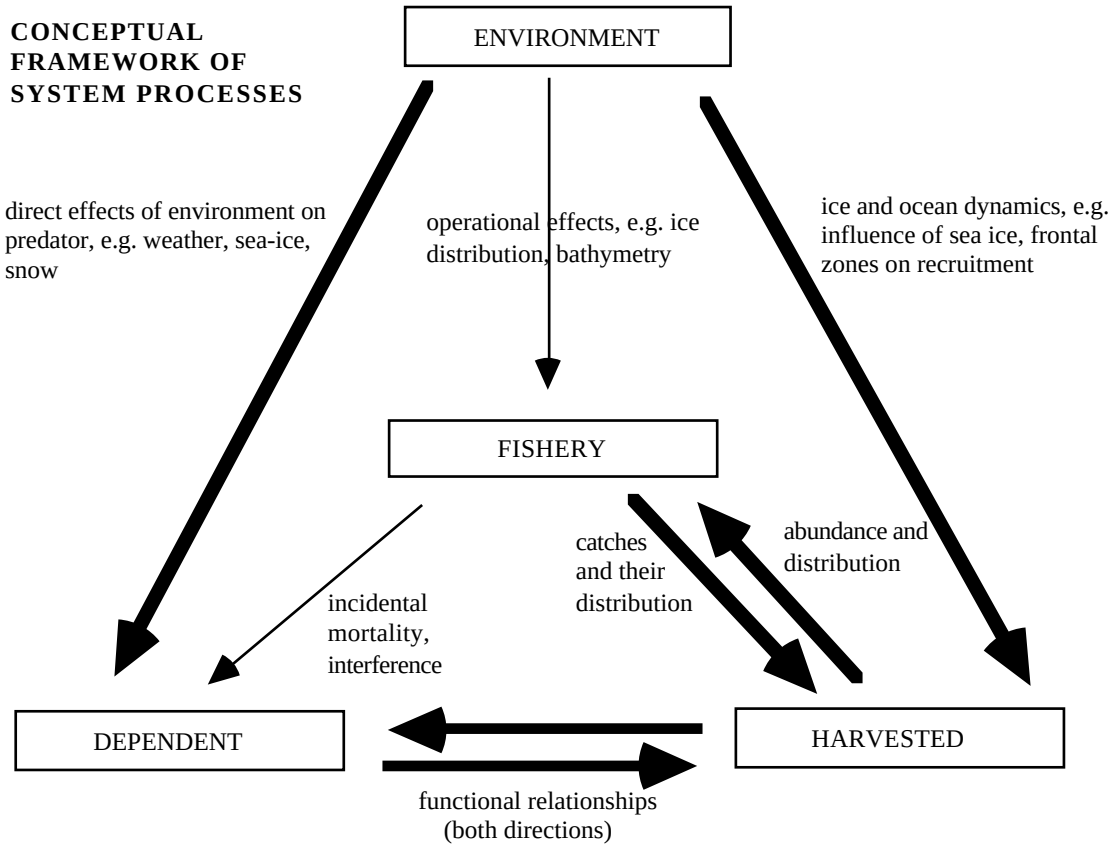

Figure 18: Conceptual framework of system processes. This figure, the first step in a strategic modelling exercise, demonstrates the relationships between Antarctic ecosystem components. The direction of arrows indicates the effect of one component on another, and the thickness of an arrow indicates the perceived importance of that link.

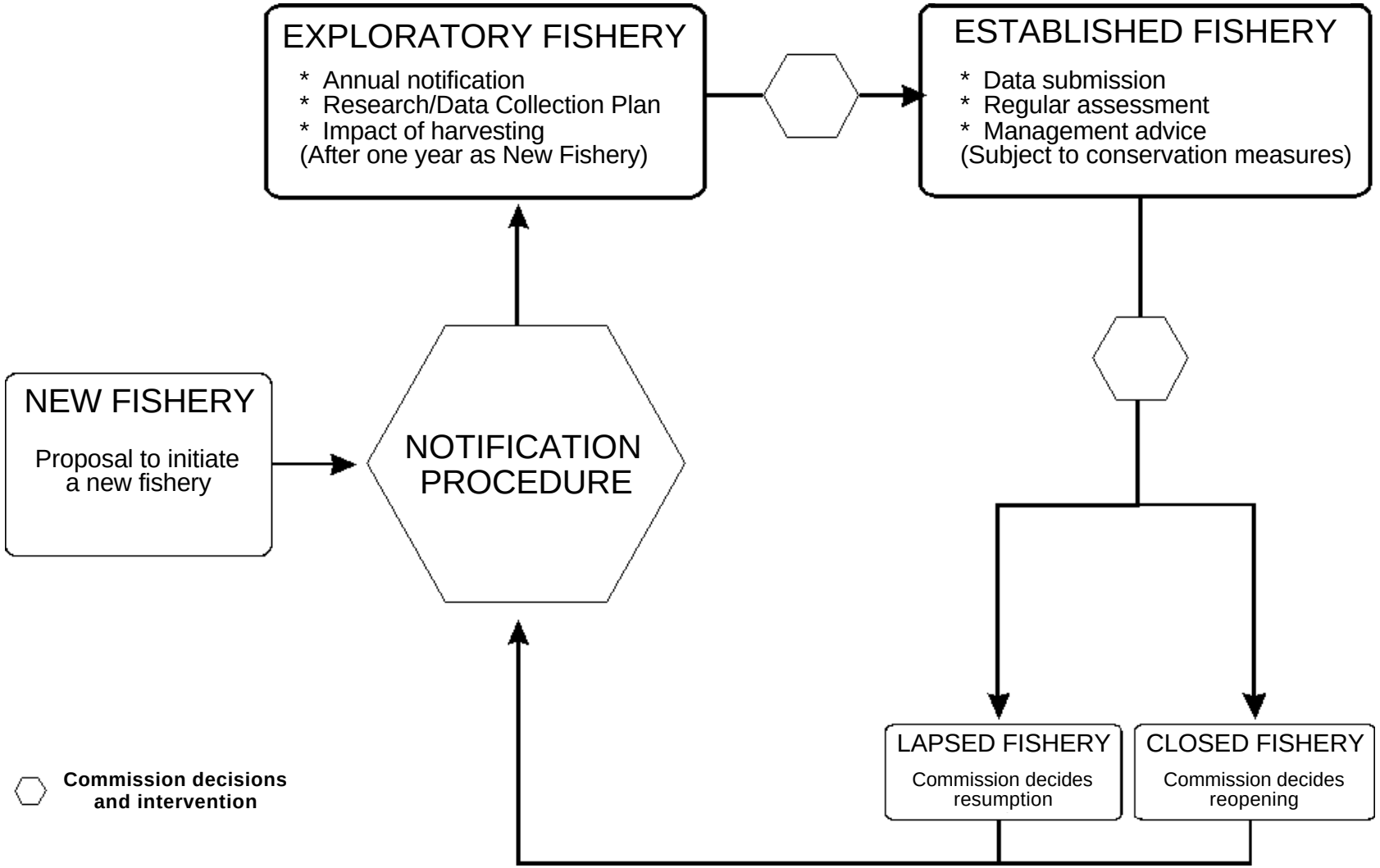

Figure 19: Stages of CCAMLR fishery development, indicating notification procedures and decision-making by the Commission.