

Marine Mammals of the Southern Ocean



Southern Ocean accounts for only ~10% of world's oceans

**Supports >50% of world's marine mammal biomass, but
low species diversity**

Species reliant on SO for habitat include:

Six species of pinnipeds

Eight species of baleen whales

Seven species of odontocete whales

**These species comprise only 1/5 of pinnipeds and 1/5 cetacean
diversity**

Otariidae: eared seals (fur seals and sea lions)

Phocidae: true seals

Only one species of fur seal south of convergence

Five species of phocids, four probably from a common ancestor

Southern Elephant Seal and Antarctic Fur Seal appear to have arrived later, closely related to northern species



Otariid



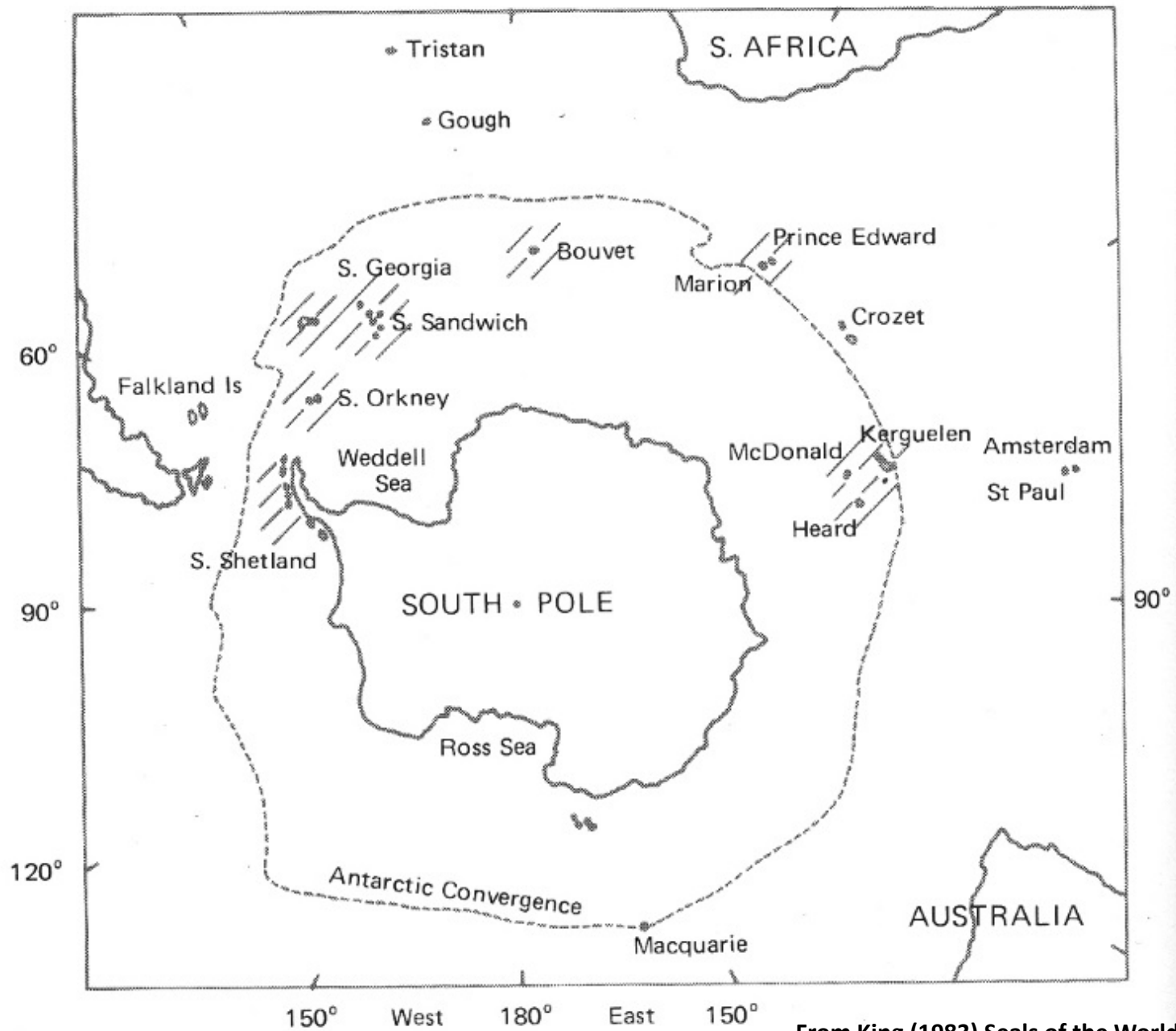
Phocids

Fur seals require open water, feed mainly on fish and krill

Antarctic fur seal (*Arctocephalus gazella*) is closely related to several other subantarctic species



Distribution of Antarctic Fur Seal



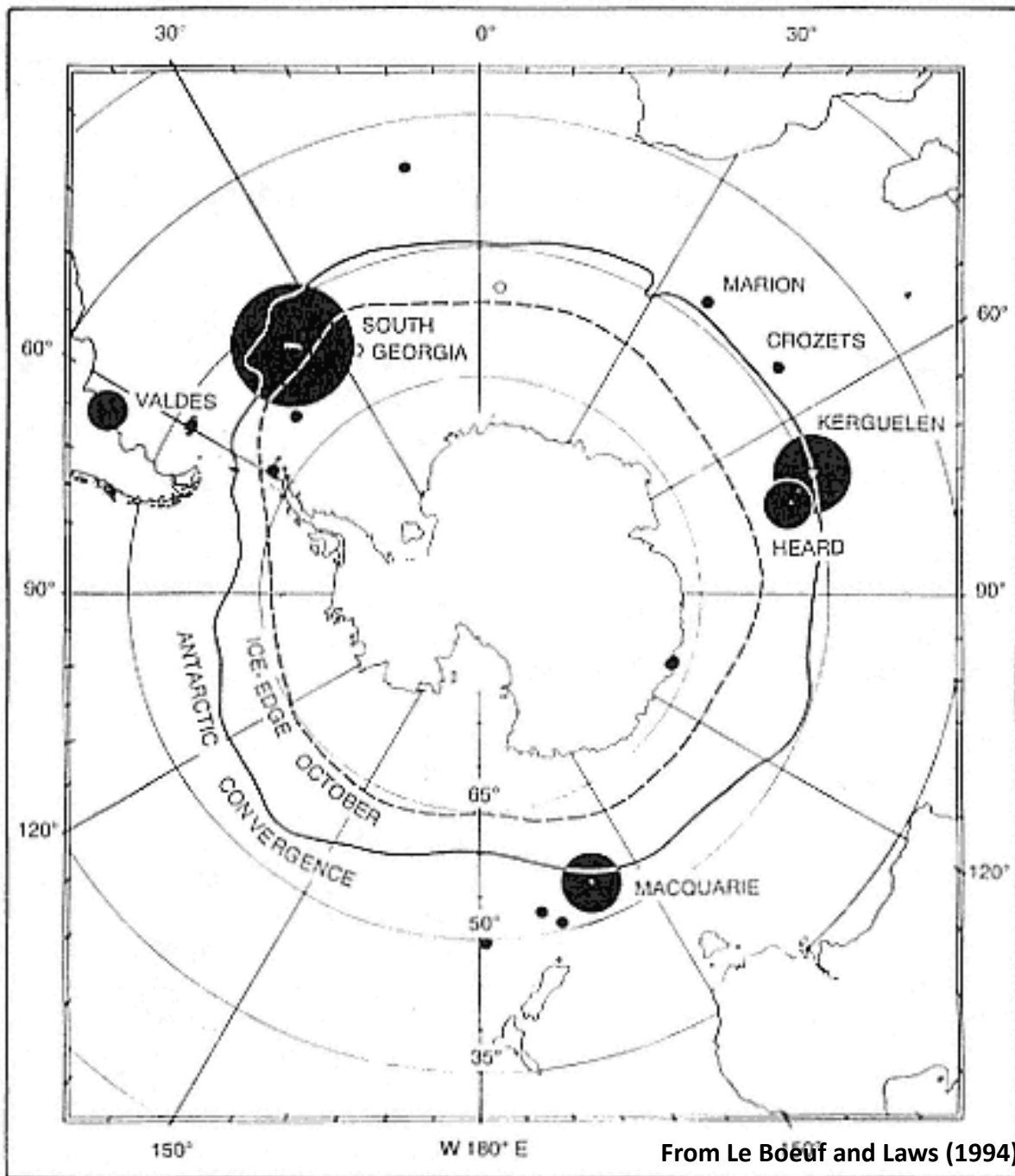
From King (1983) Seals of the World

**Antarctic species feeds mainly on krill and fish
Populations recovering on South Georgia after sealing ended
Densest aggregation of a marine mammal in the world, up to 4 million
or 95% of population at South Georgia**



Southern elephant seal (*Mirounga leonina*)





From Le Boëuf and Laws (1994)

Northern elephant seal similar in life history and ecology





**Southern elephant seals numbers are rebounding
More are seen on Antarctic beaches post-breeding**

**Southern elephant seals are larger than the northern and
adult males can weigh up to five tons**

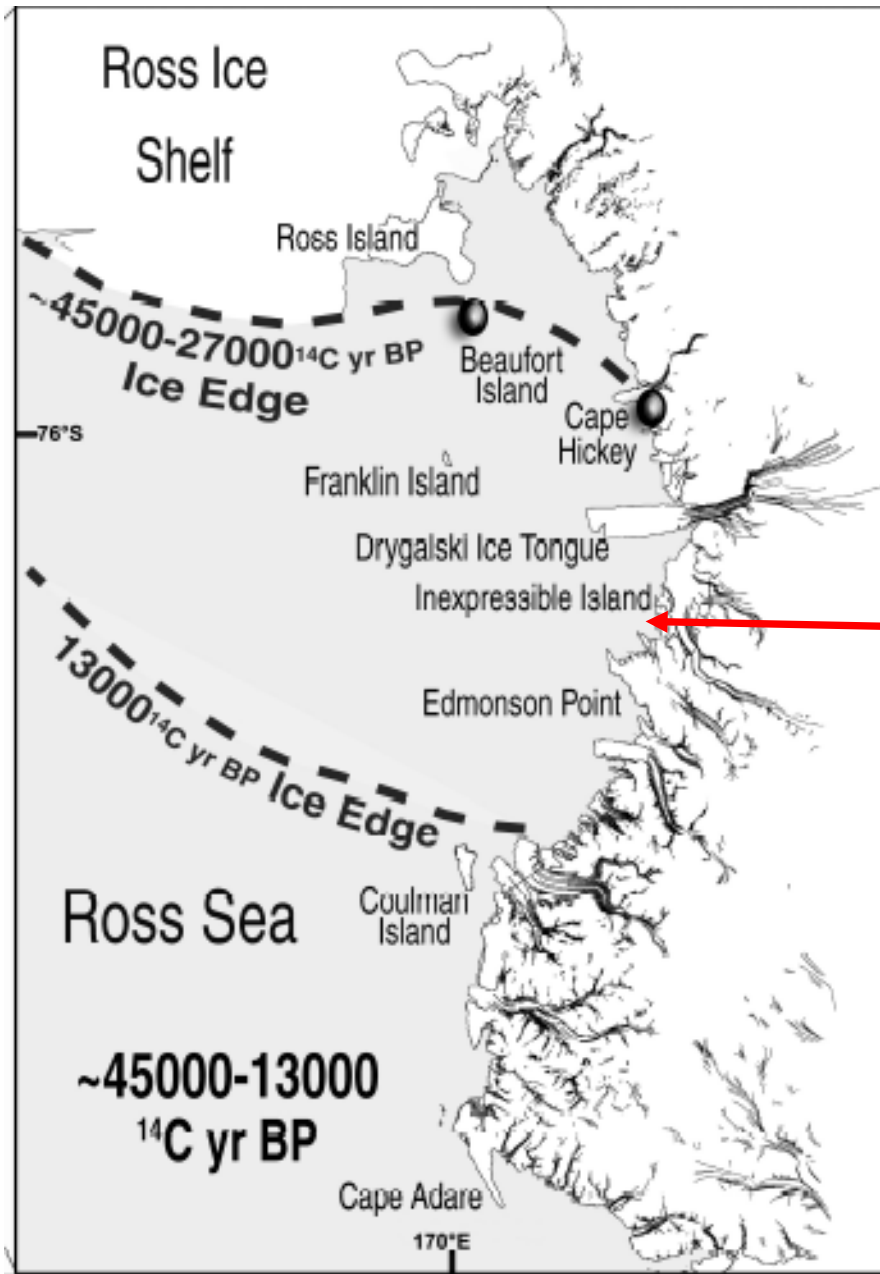
**Deepest diving non-cetacean, over 1 mile depth to feed
mainly on squid**



Seal wallows of molting animals common in Antarctica, especially the AP



[Eseal wallow](#)



**Terra Nova Bay
Polynya**



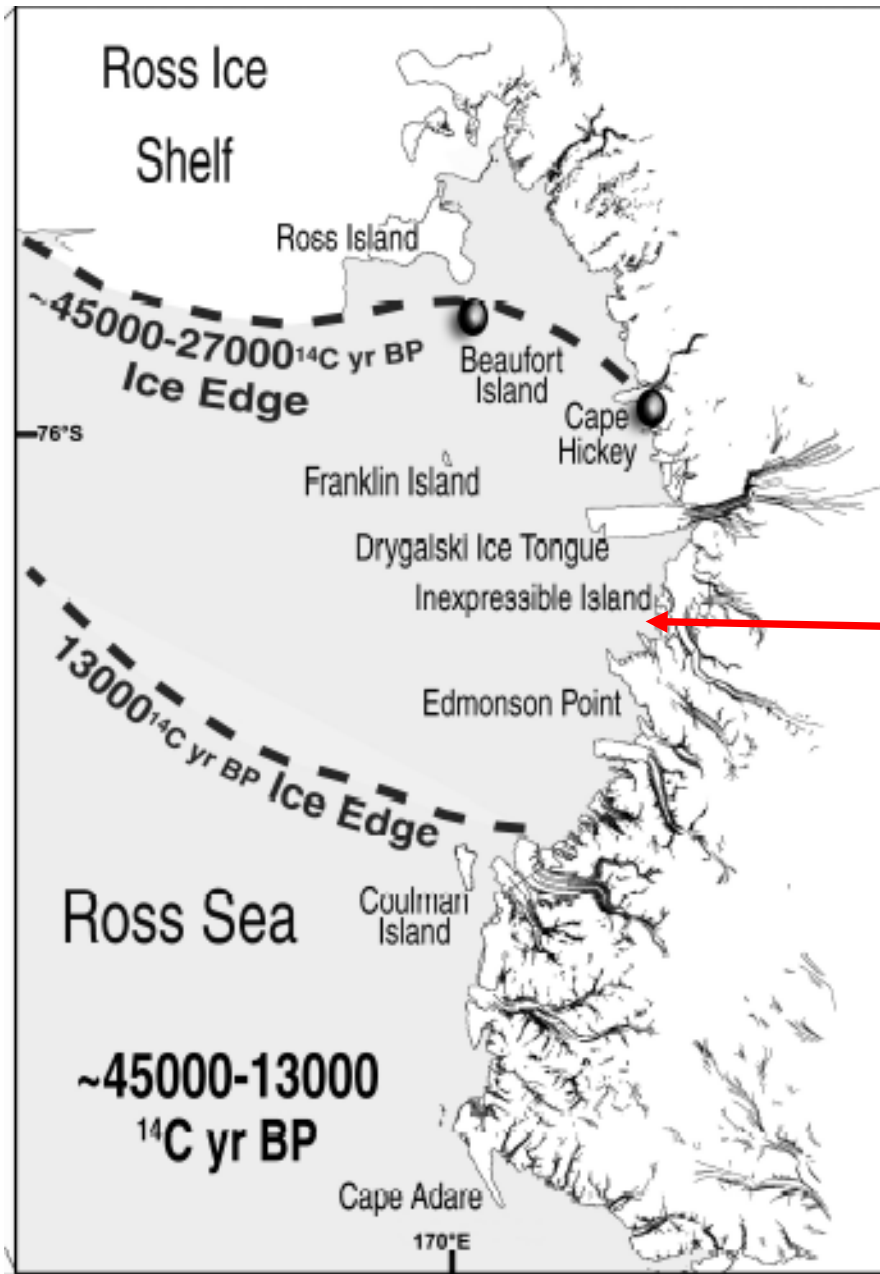
Nine seal carcasses documented on Inexpressible Island, various states of decay





Appears to have been a haul out place for molting animals over decades to hundreds of years, perhaps from Macquarie Island colony





**Terra Nova Bay
Polynya**

Weddell Seal









<https://www.niwa.co.nz>



Crabeater Seal

Considered the most abundant seal in the world





Complex teeth in a crabeater seal

Leopard Seal



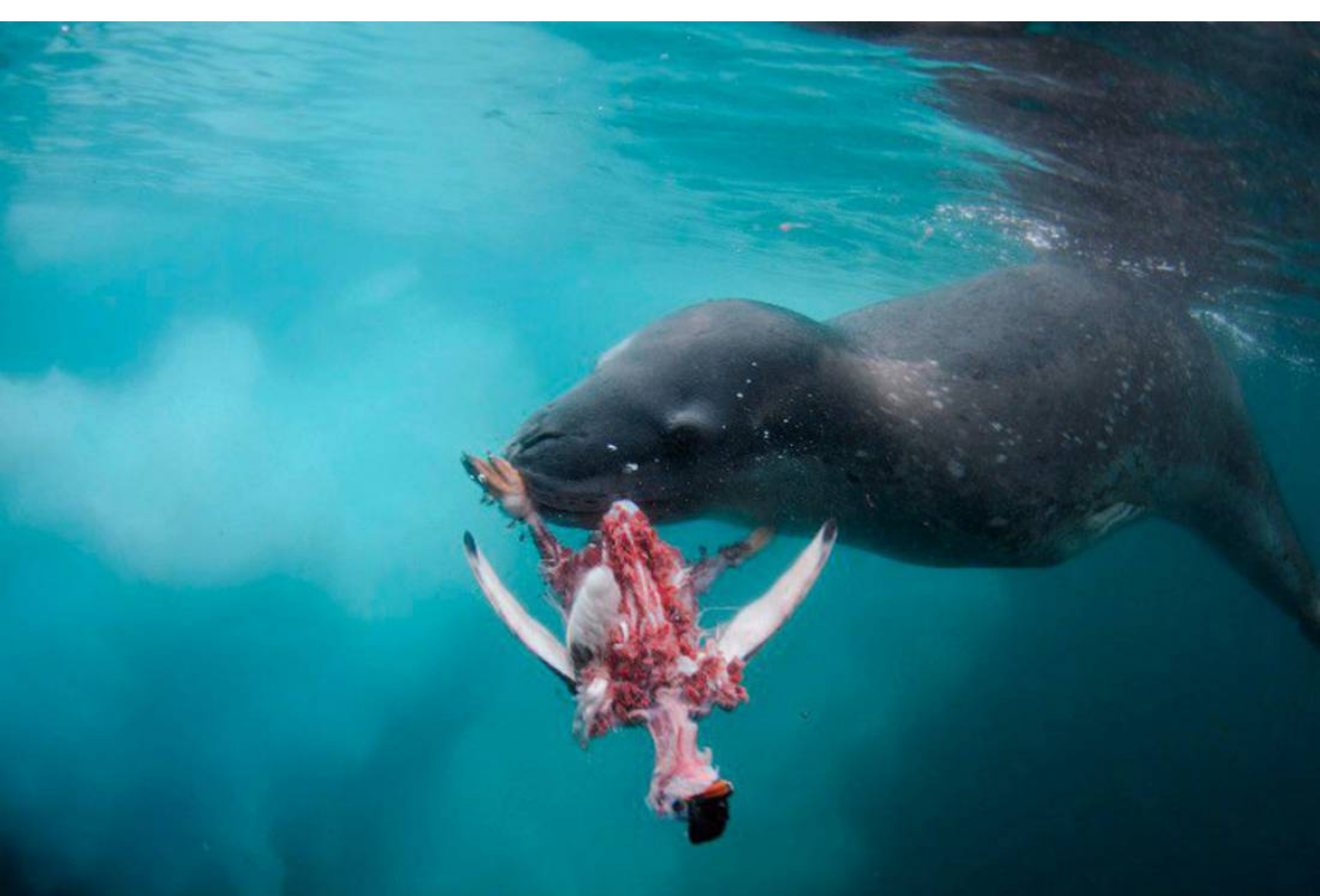
Primarily eats krill and fish, but some specialize on penguins



Weddell and Leopard Seal resting on an Antarctic beach







Ross Seal

Lives on and near pack ice, but very little known about it



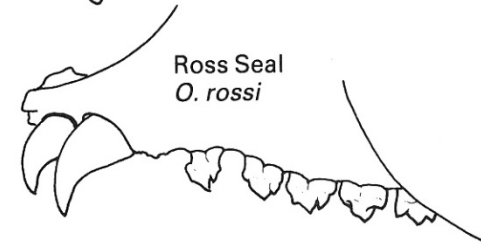
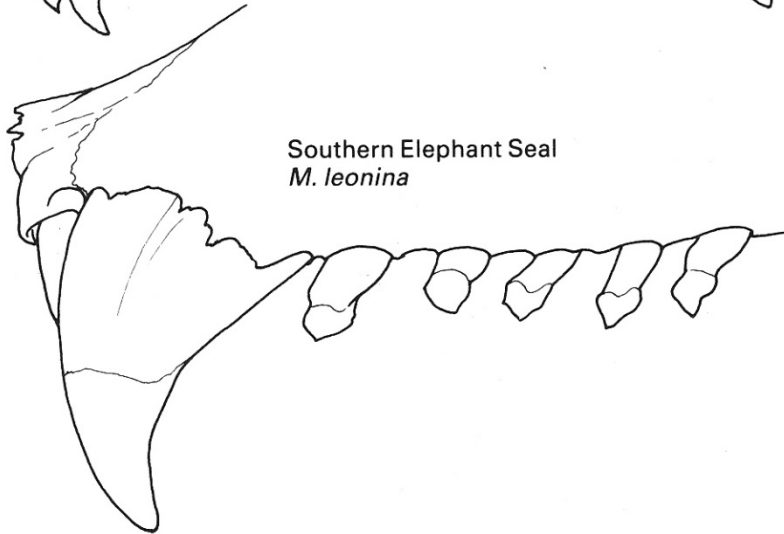
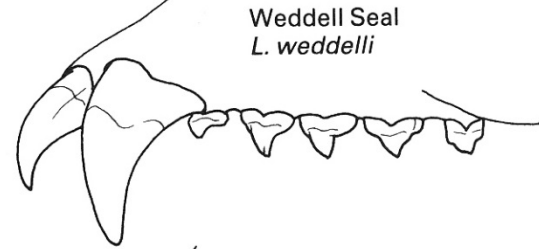
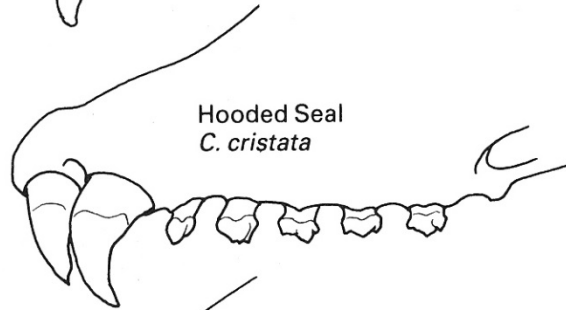
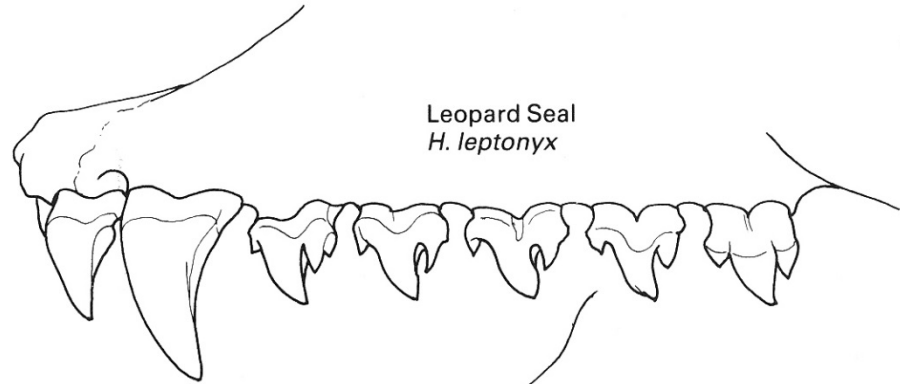
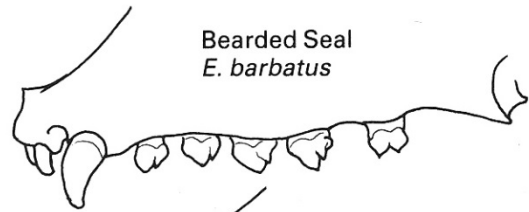
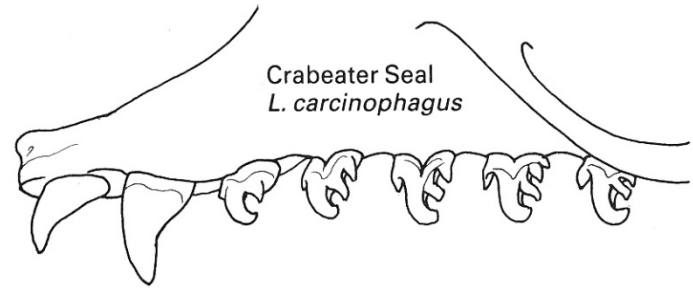
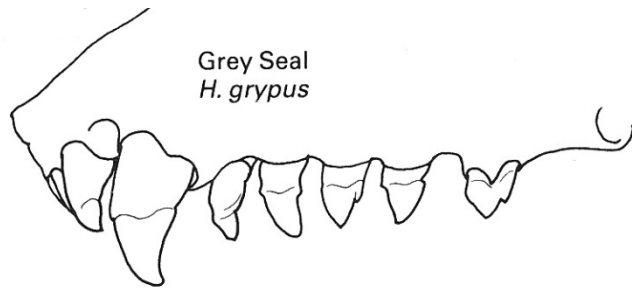
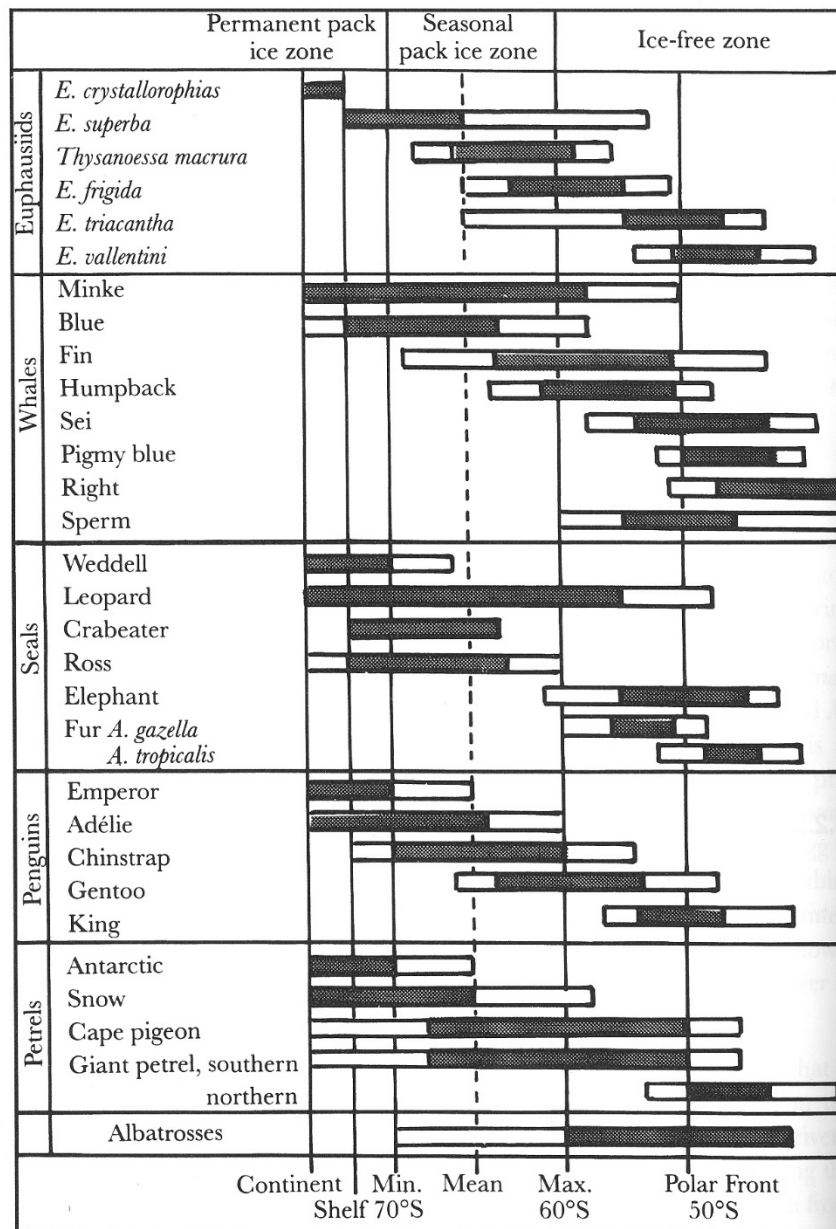


Fig. 7.4 Drawings of phocid teeth.

Weddell seal scraping ice



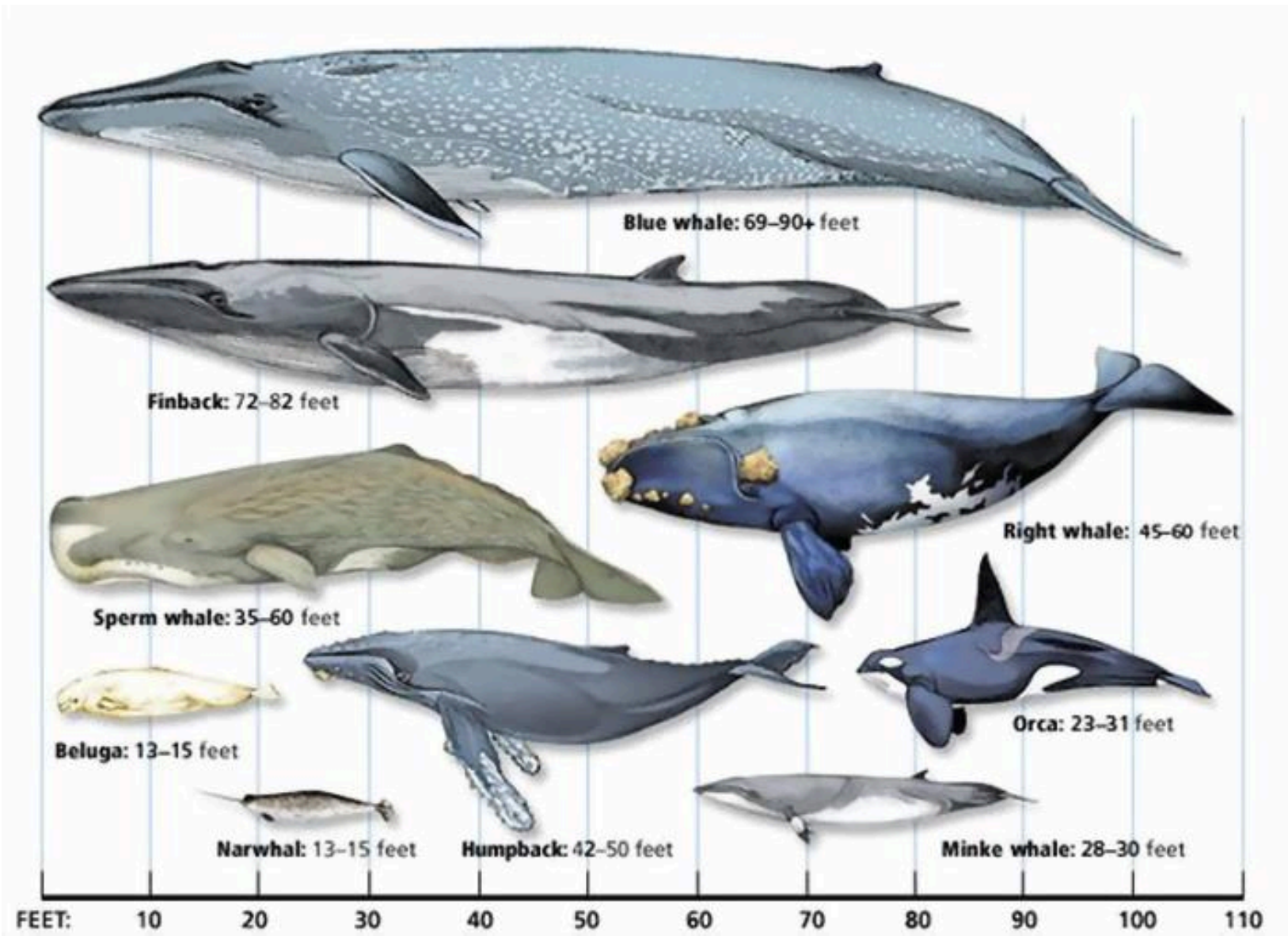
Zones occupied by selected species of euphausiids, marine mammals, and birds, from the Antarctic continent northwards. Each species has a circumpolar distribution and the average latitudinal range is given, with the shaded areas indicating the greatest densities. (Redrawn after Laws 1977 by courtesy of the author.)

Cetaceans of the Southern Ocean

Odontoceti: toothed whales

Mysticeti: baleen whales





Most abundant species today are:

Orcas, or Killer Whales

Humpback Whales

Fin Whales

Minke Whales

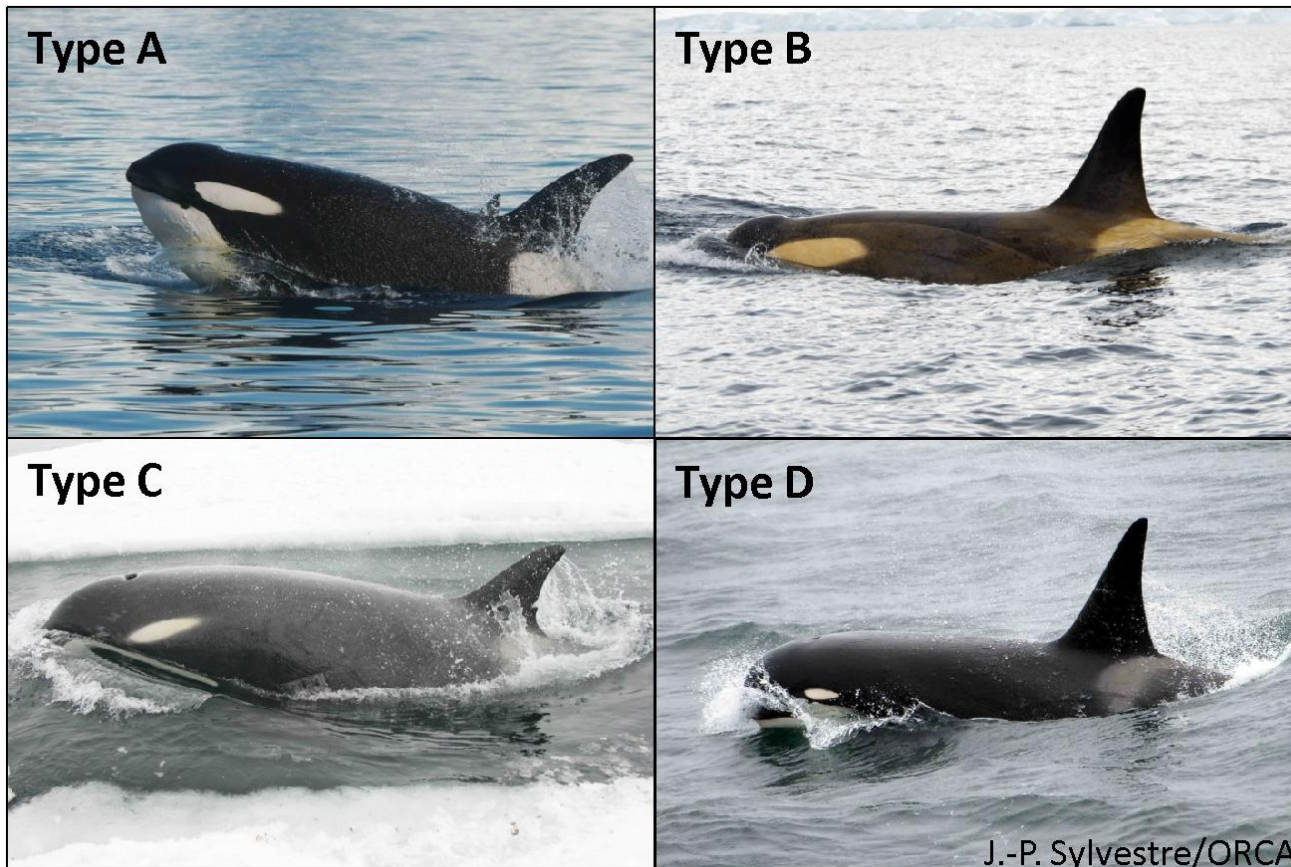
Sperm, Right and Blue whales still recovering



At least three species of orca may exist in Antarctica:

Differ in morphology, behavior, and diet

**Type A feeds on minke whales, Type B on Antarctic seals, penguins
Type C on fish, and Type D is unknown, subantarctic**



**Note differences
in size and shape of
white patch by eye**

[Tagging Type A](#)

Orcas hunt around the pack ice by ‘spy hopping’, or sticking their heads out of the water to see if seals are on ice floes



Hunt in packs and can even wash seals from small ice floes:

[Orcas hunting seal](#)



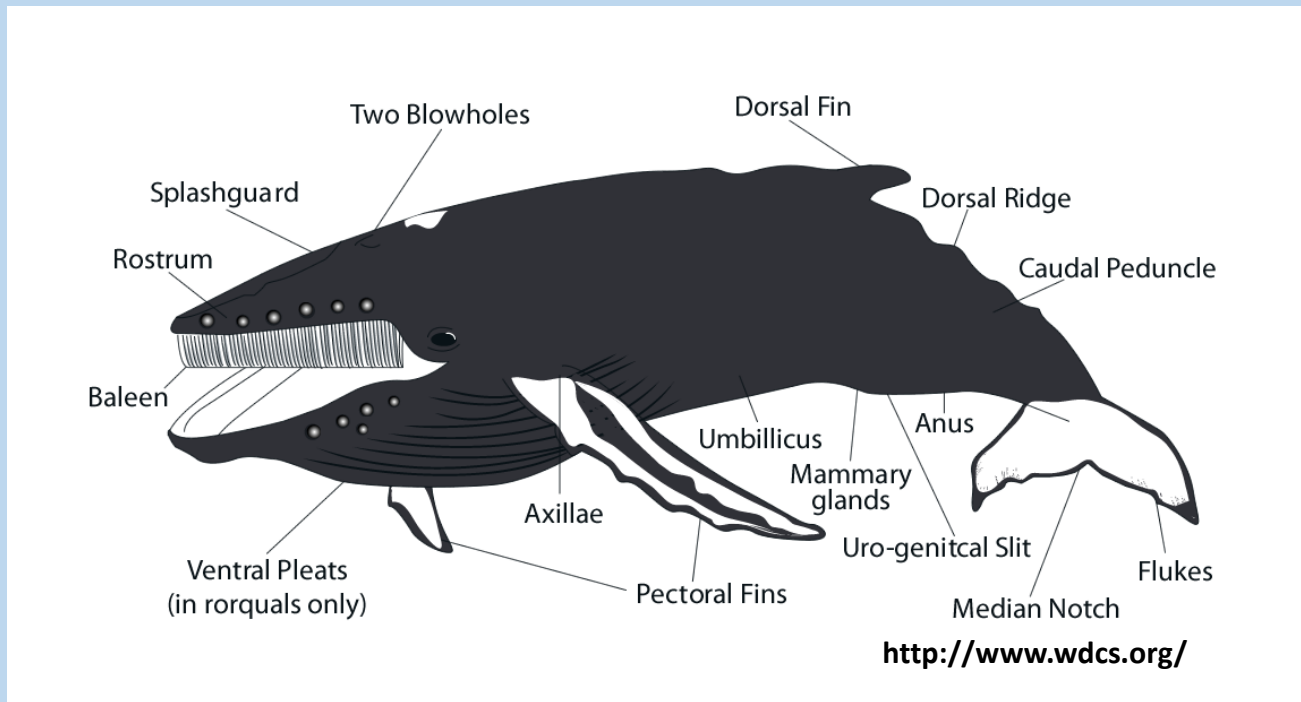
75 hrs of observations
14/15 seals taken were Weddell
12 of 14 taken off ice floes
Weddells are only 15% of seals in area
'Butchered' seals in a meticulous manner

Pitman and Durban 2012

Observations of Orca Type B hunting behavior in the Ross Sea

**Baleen whales feed by engulfing water plus krill
Sift out krill using baleen in jaws**

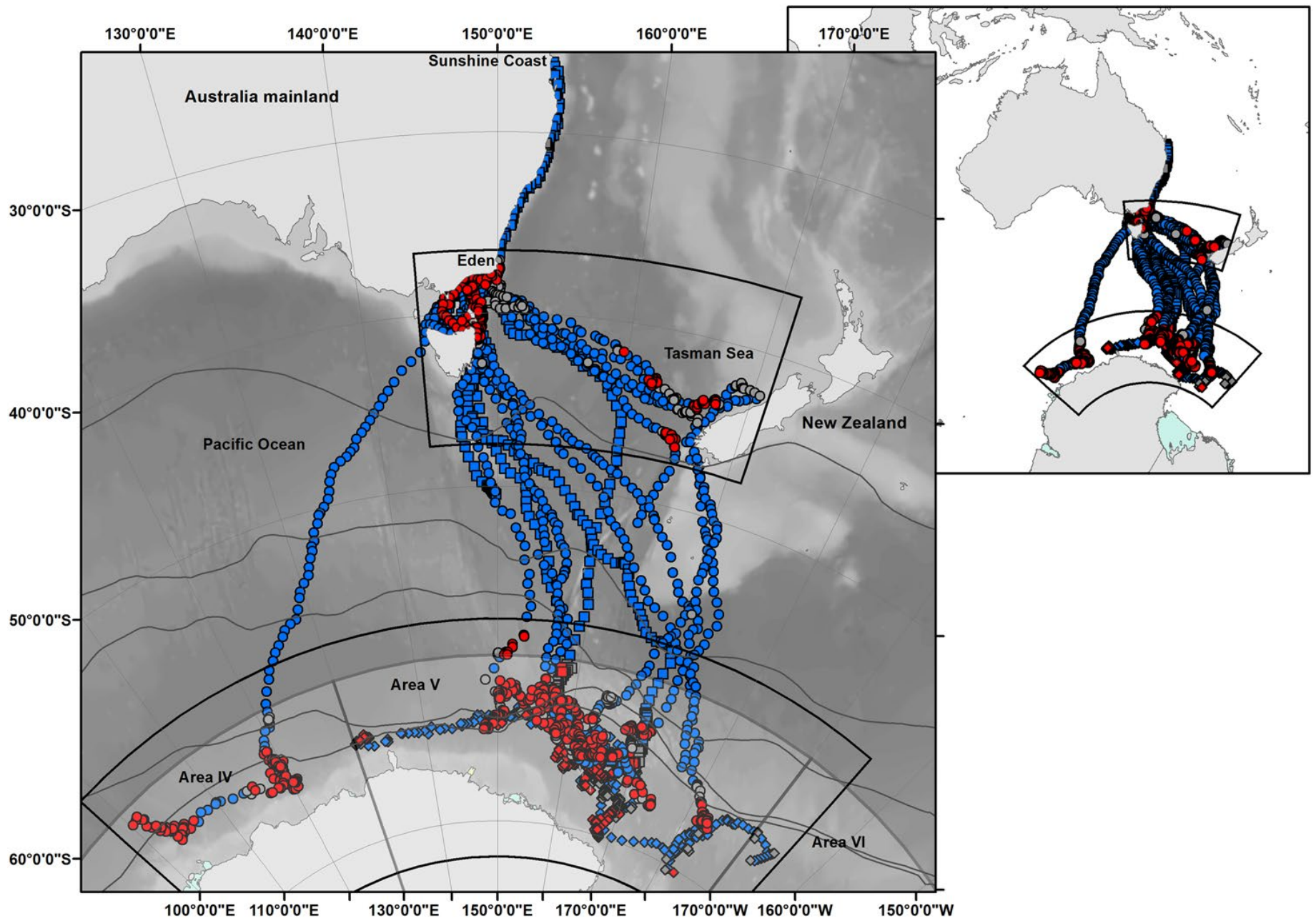
**Humpback whales travel thousands of miles to reach
the Southern Ocean in summer to harvest the rich
bounty of krill**



[Humpbacks feeding on krill](#)

Characteristic 'fluking' when they dive, tail fin distinct by individuals





Most abundant whale in Antarctic coastal waters in summer



[Underwater view](#)

Photo: Ari Friedlaender

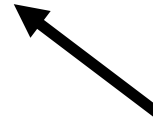
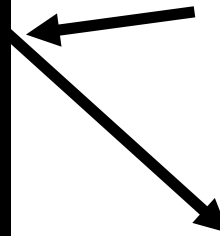
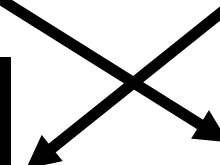
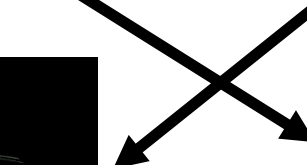
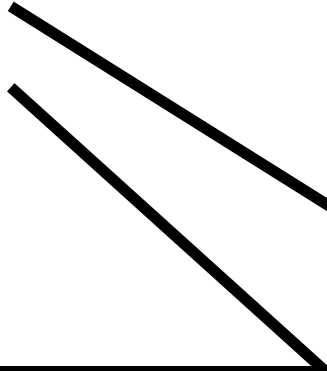
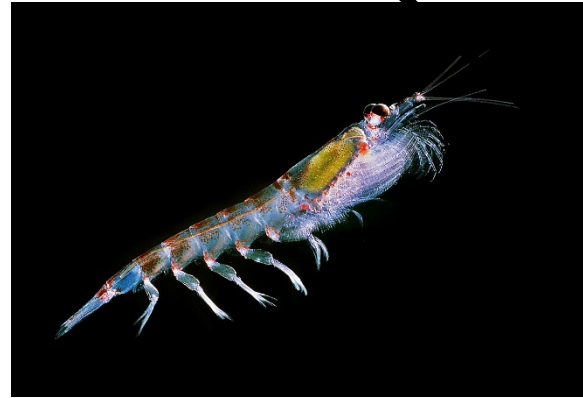
Minke Whales

Feed in and near the pack ice
Very common in Southern Ocean





Minke whales usually seen feeding in groups
One of the smallest of the baleen whales
Trophic interactions (Ainley et al. 2010)



Quiz

1. What four species of pinnipeds are endemic to Antarctica?
Why are so few cetaceans endemic?
2. Why is there more known about Weddell Seals than any other pinniped in Antarctica?
3. What are the four 'types' of killer whales in Antarctica and how do they hunt for prey?
4. What are baleen whales and how do they feed?
5. What is the diet of crabeater seals?