A photograph of several large icebergs floating in the dark water of the Antarctic at night. A bright yellow moon is visible in the dark blue sky. The icebergs are illuminated from below, creating a blue glow. The water is dark, and the moon's reflection is visible on the surface.

**IAE5  
Climate  
Change**

# **The Ecology of Antarctica**

**IMSA Amsterdam**

**Inspire Antarctic Expedition 5**

**February 17 - March 3, 2007**



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# Antarctic Food Web

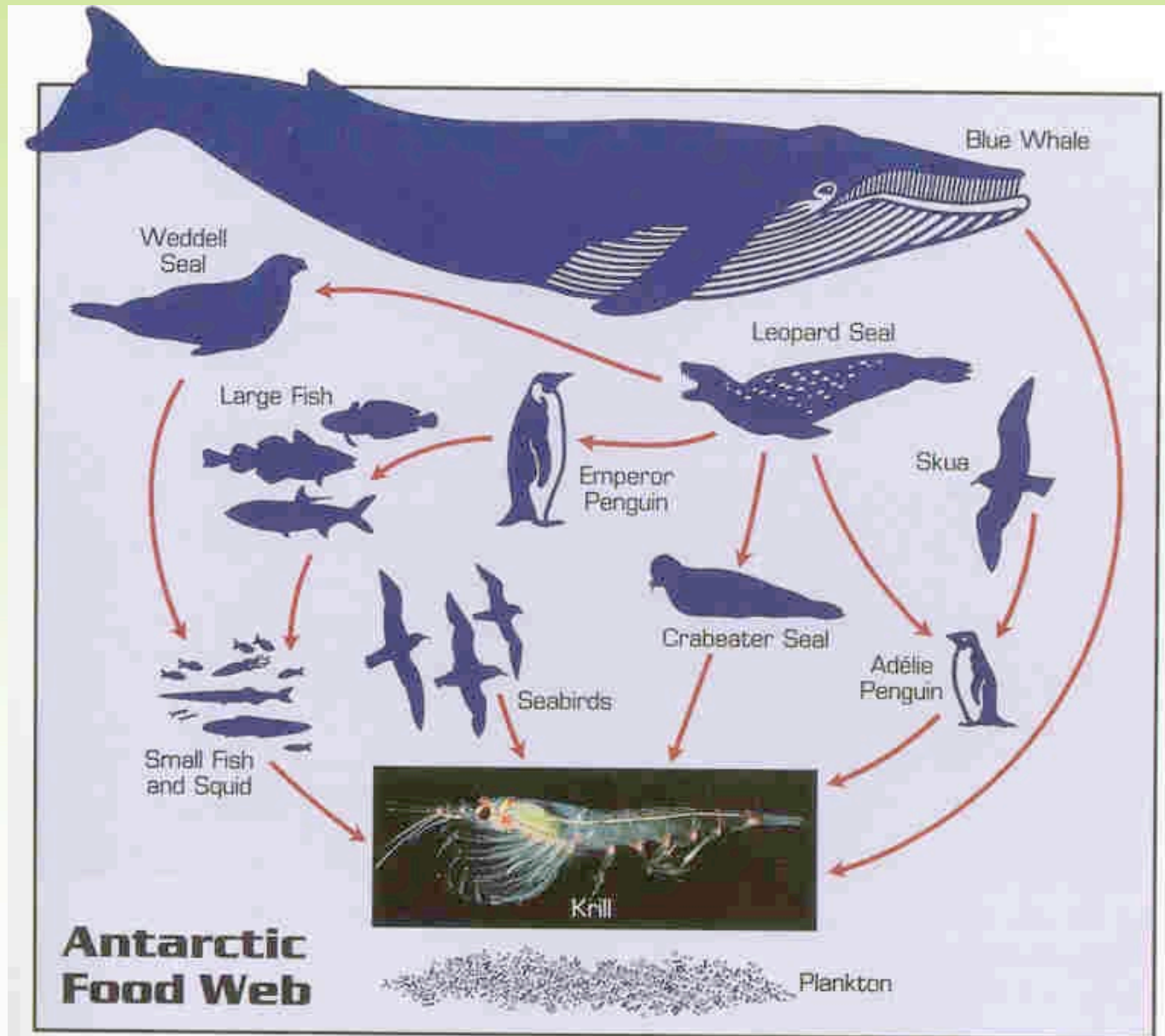
- Krill is at the center of Antarctic food web
- Krill is Norwegian whaling term meaning “small fry”
- Birds (incl. penguins), seals, fish, squid and whales feed on krill
- Krill eats phytoplankton, growing just underneath the sea-ice
- Krill endangered by over-fishing, climate change and UV-B





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# Antarctic Food Web





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# Krill ice-feeding

Krill eating phytoplankton growing on the bottom surface of sea ice



ANT032



# Fish

- Only 120 species of fish in Southern Ocean (20.000 worldwide)
- 84 in Antarctic waters
- Adaptation to cold
  - Very efficient metabolism
  - No red blood cells
  - Wider veins
  - Fat insulation
  - Anti-frost in blood





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# Penguins



- 7 penguin species (18 worldwide)
  - Adélie
  - Macaroni
  - Gentoo
  - Chinstrap
  - Rockhopper
  - King
  - Emperor
- Only species to stay on Antarctica during winter
- Penguins fly under water

# Birds

- 19 breeding species
- 6 species are resident
- Breeding restricted to short summer
- Birds consume 100 million tons of krill annually (90% penguins)
- Most Antarctic birds belong to 2 orders:
  - Coastal based skuas, gulls and terns
  - Ocean ranging albatrosses and petrels

*Southern Giant Petrel*

# Whales

- 8 species in Southern Ocean: Blue, Fin, Humpback, Minke, Orca, Southern Right, Sei, Sperm Right
- Population: 2.5 million pairs
- Location: oceans worldwide (no passing of equator)
- Size: 25 to 100 feet (6 to 30 meters)
- Weight: up to 70 tons
- Diet
  - Balein whales: krill
  - Teeth whales: fish, birds, marine mammals



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# Antarctic Treaty

ANTARCTIC TREATY SECRETARIAT  
SECRETARIAT DU TRAITÉ SUR L'ANTARCTIQUE  
SECRETARÍA DEL TRATADO ANTÁRTICO  
СЕКРЕТАРИАТ ДОГОВОРА ОБ АНТАРКТИКЕ

- Antarctic Treaty
  - signed in 1959
  - into force 1961
  - 12 countries
- Environmental Protocol
  - added in 1991
  - into force in 1998
  - 40 countries
- Environmental Protocol to be renewed by 2041.



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# Threats to Antarctica

- Global warming
- Ozone hole
- Whaling and over-fishing
- Tourism
- Other?

*Invasive species hitchhiking on tourist vessels are able to survive in the warming Antarctic that used to be too cold.*





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# Additional Info



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# Antarctica Map





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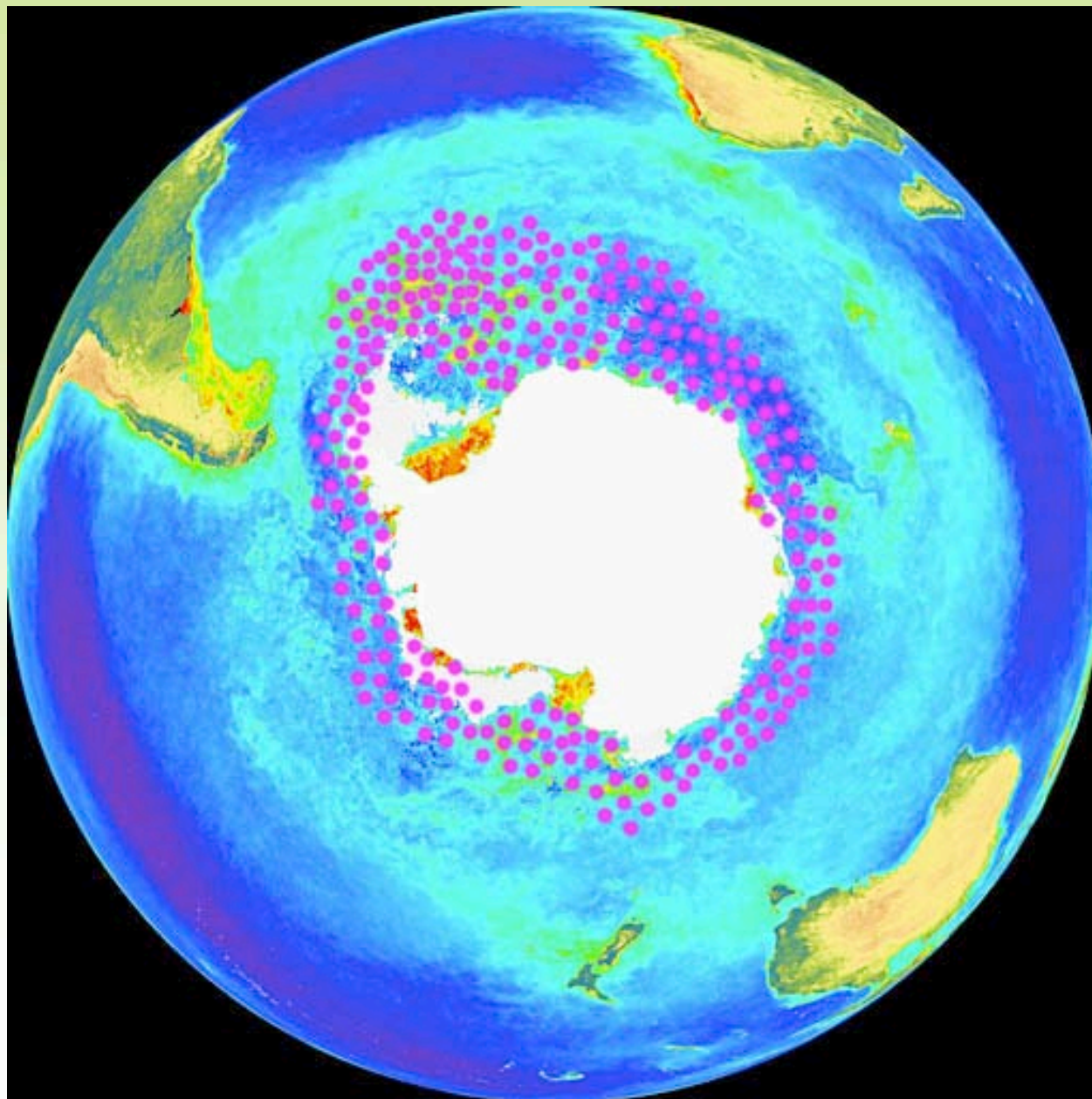
# Treaty Member States (flags)





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# Krill Distribution



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