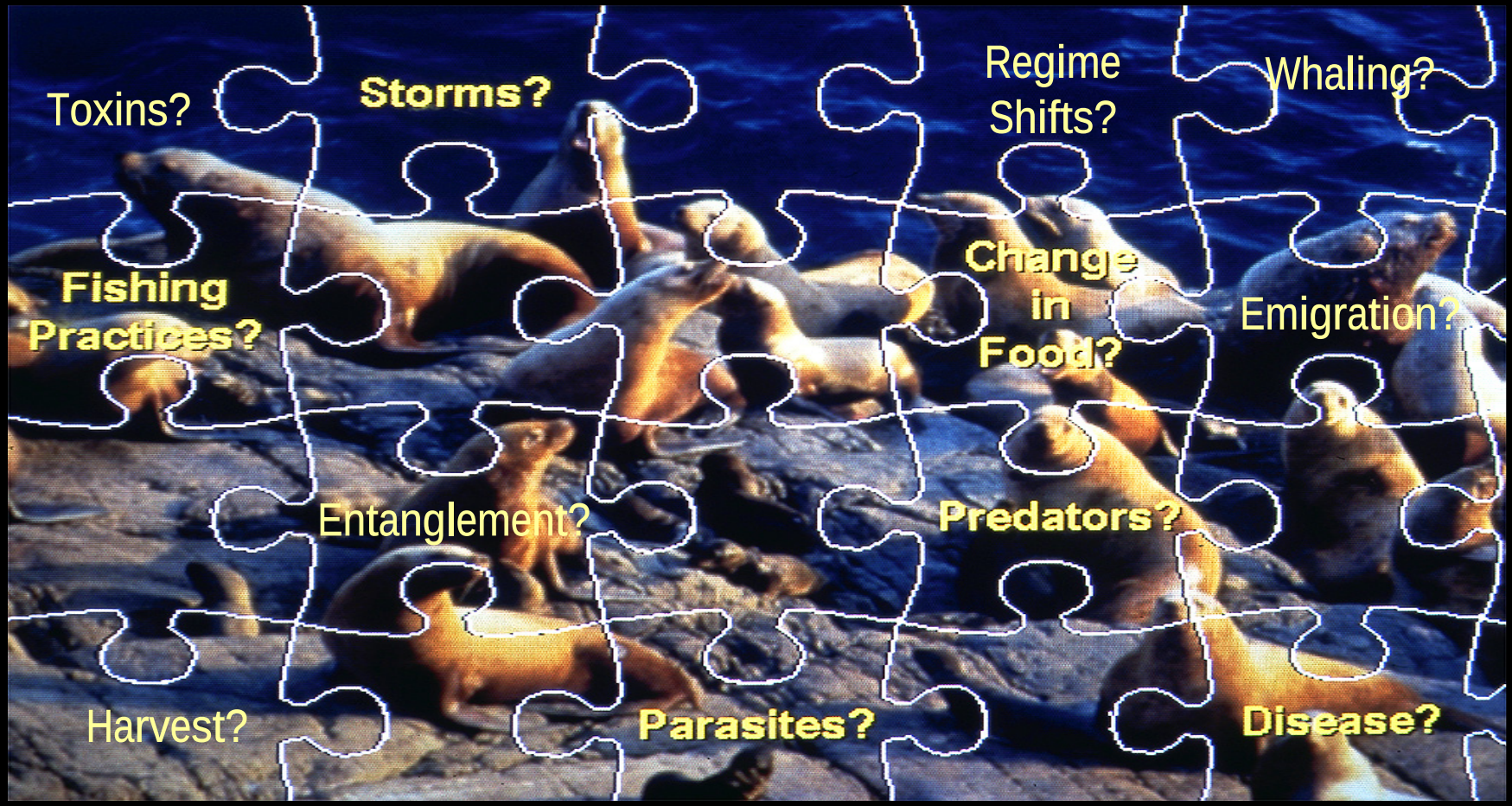
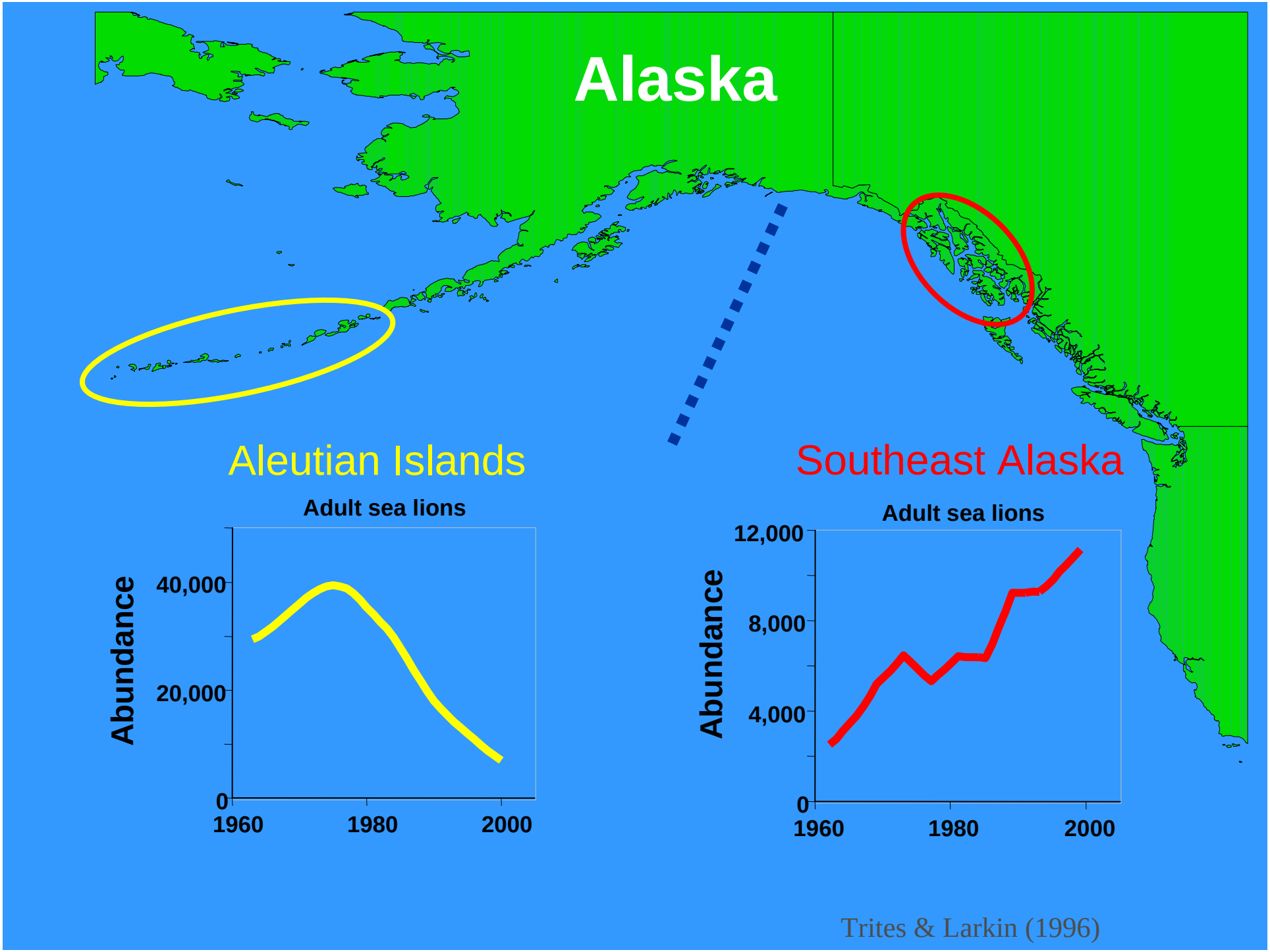
Ecosystem Modeling and Species Interactions



Andrew W Trites

North Pacific Universities
Marine Mammal
Research Consortium



Trites & Larkin (1996)

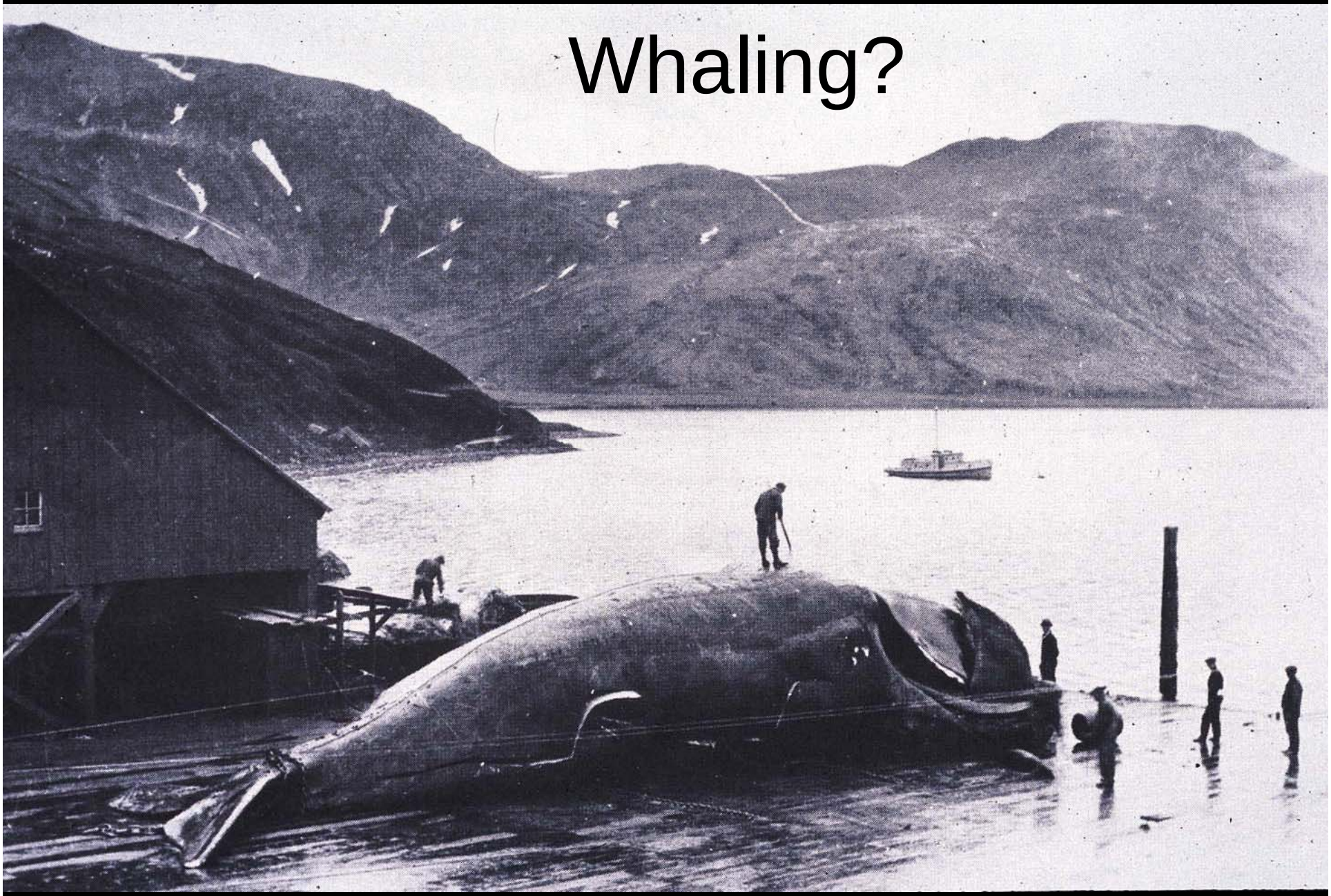
Gulf of Alaska trawl catches

1960’s

1970’s

1980’s

Whaling?

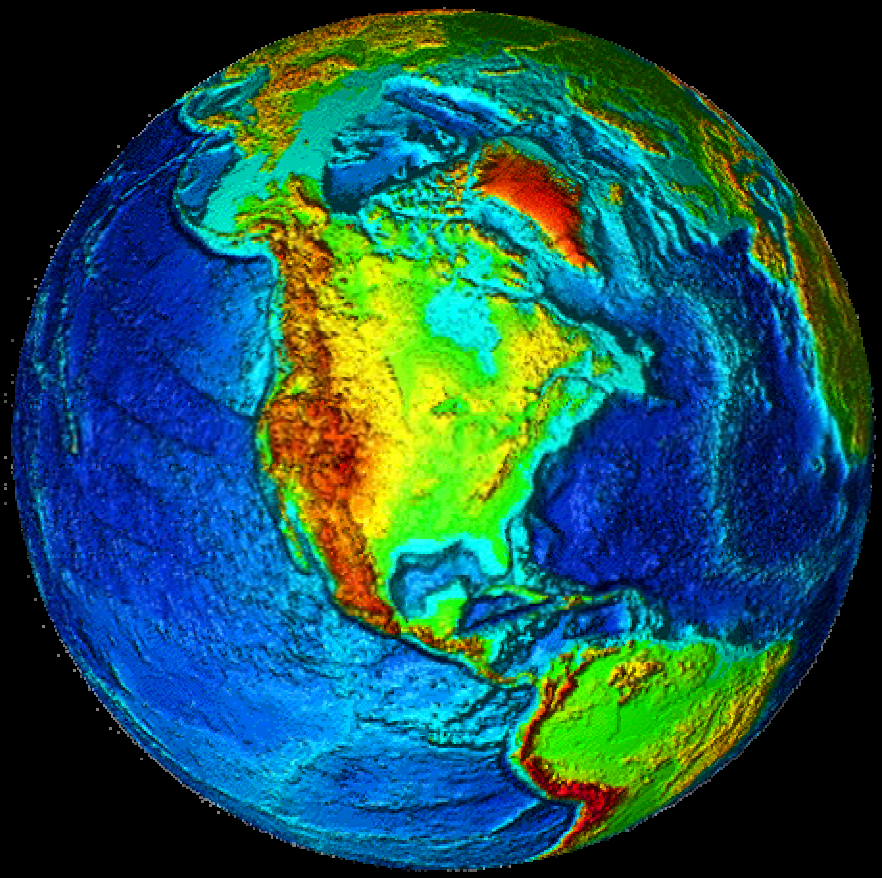


Killer whales?

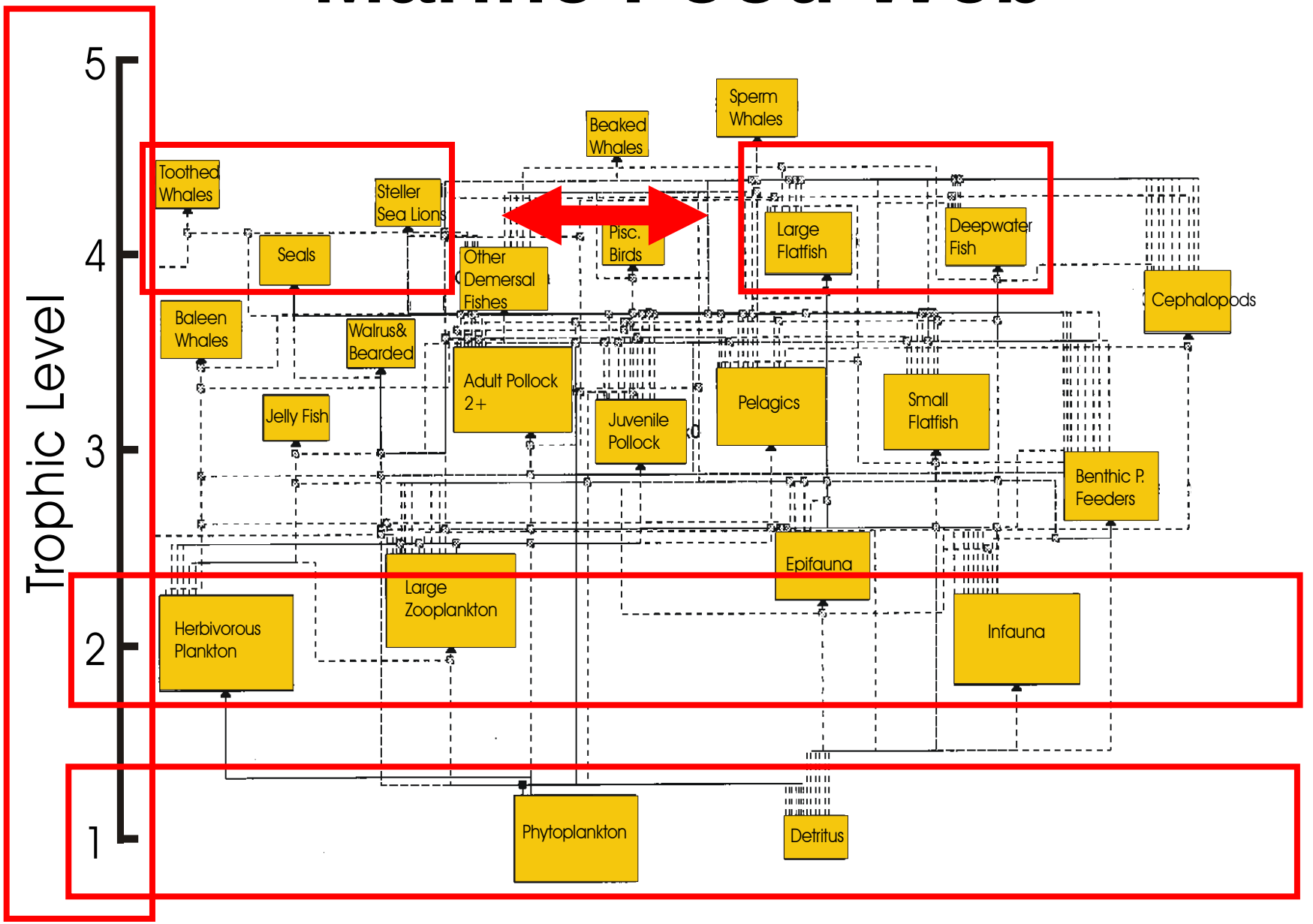
Fisheries?

Ocean Climate Change?

- Regime shifts
- 1976-77



Marine Food Web



Trites *et al.*(1999) *Fish. Cent. Res. Rep.* 7, 106 p.

Alaska

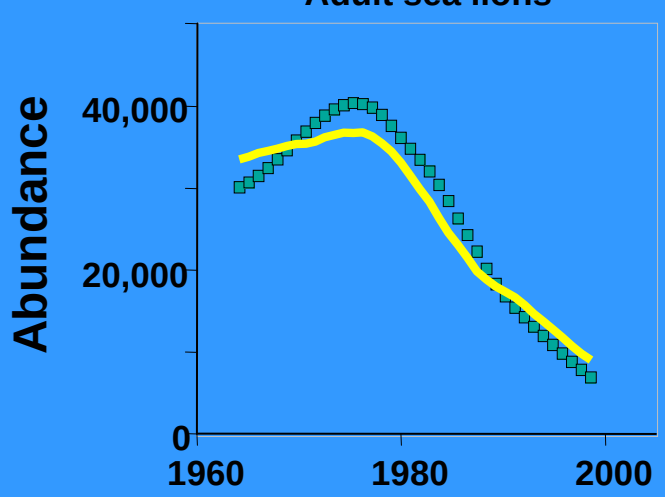
Fishing

Predation

Aleutian Islands

Competitive Interactions

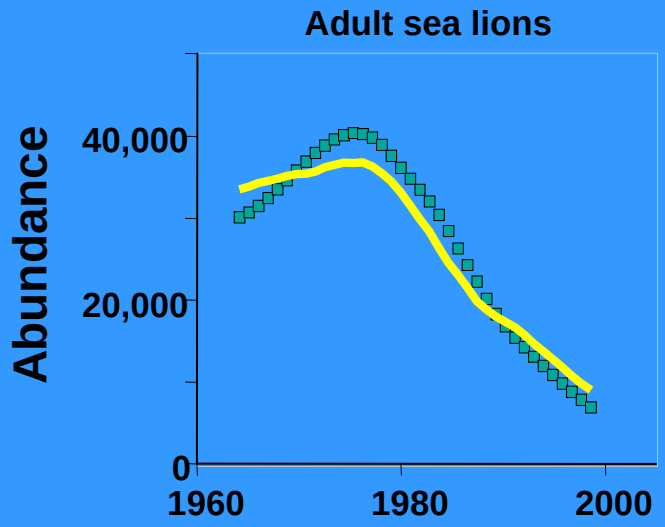
Ocean Climate Change



Guenette, Heymans, Christensen & Trites (in prep)

Alaska

Aleutian Islands

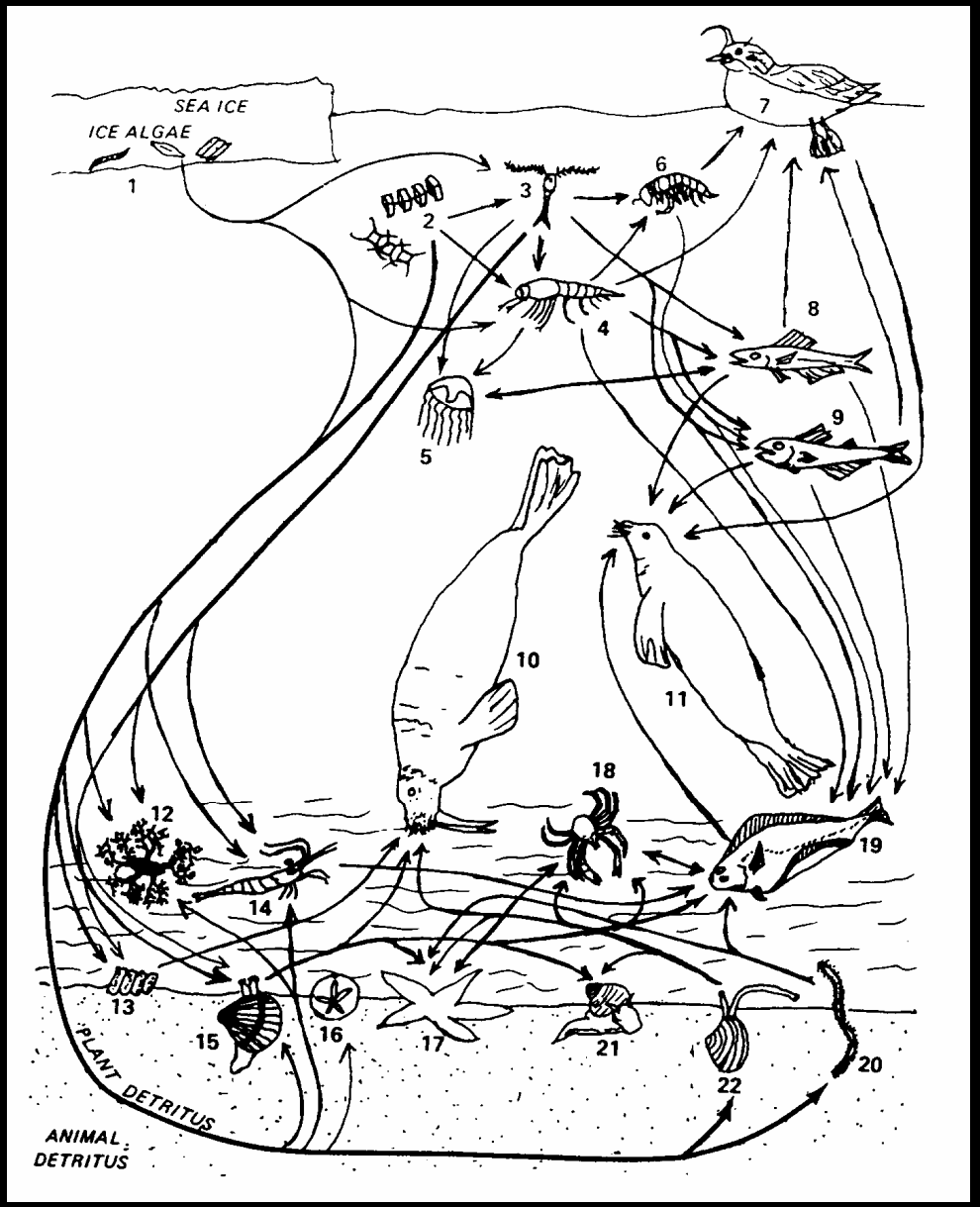


- Sea lion decline primarily explained by Ocean Climate and Predation
- Fishing and competition with flatfish contributed to a lesser degree

Guenette, Heymans, Christensen & Trites (in prep)

Insights from Models

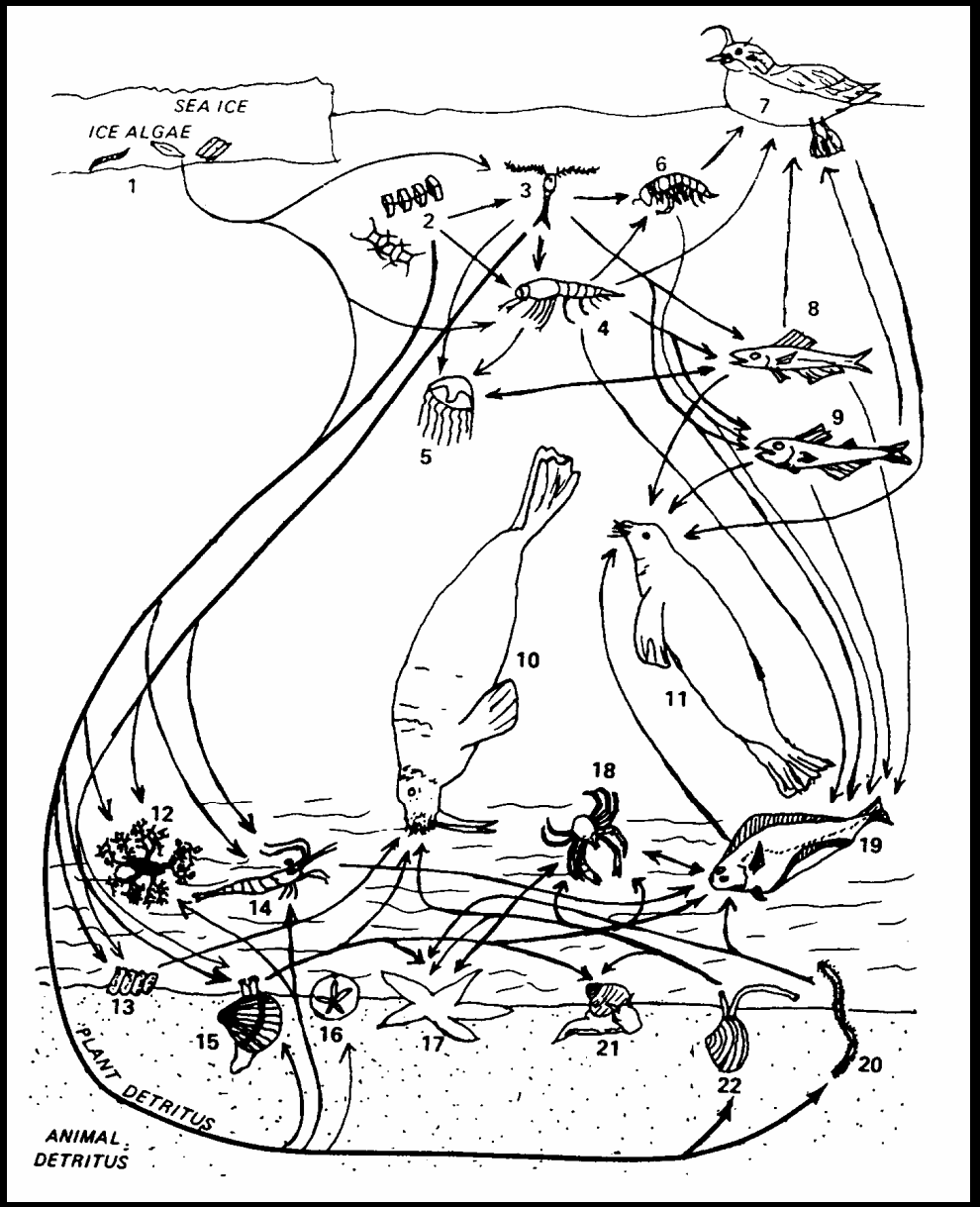
- Powerful tools for understanding consequences of actions & events on components of the ecosystem
- One of a suite of tools that can be used by fisheries scientists to manage marine ecosystems



Insights from Models

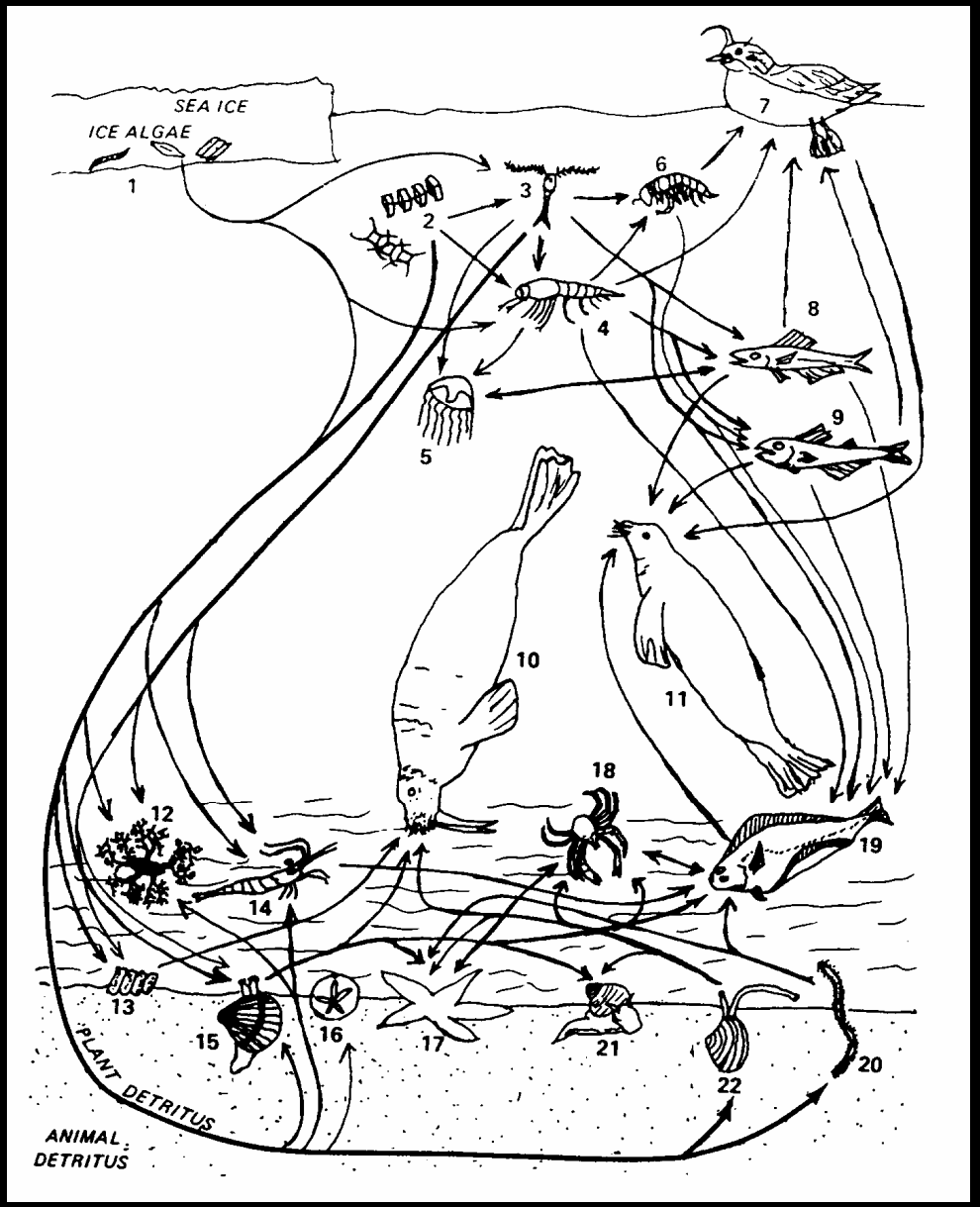
Oceans complicated

- Models help to organize knowledge & identify data gaps
- Few simple direct cause and effect relationships
- Marine ecosystems can exist in alternate states



Insights from Models

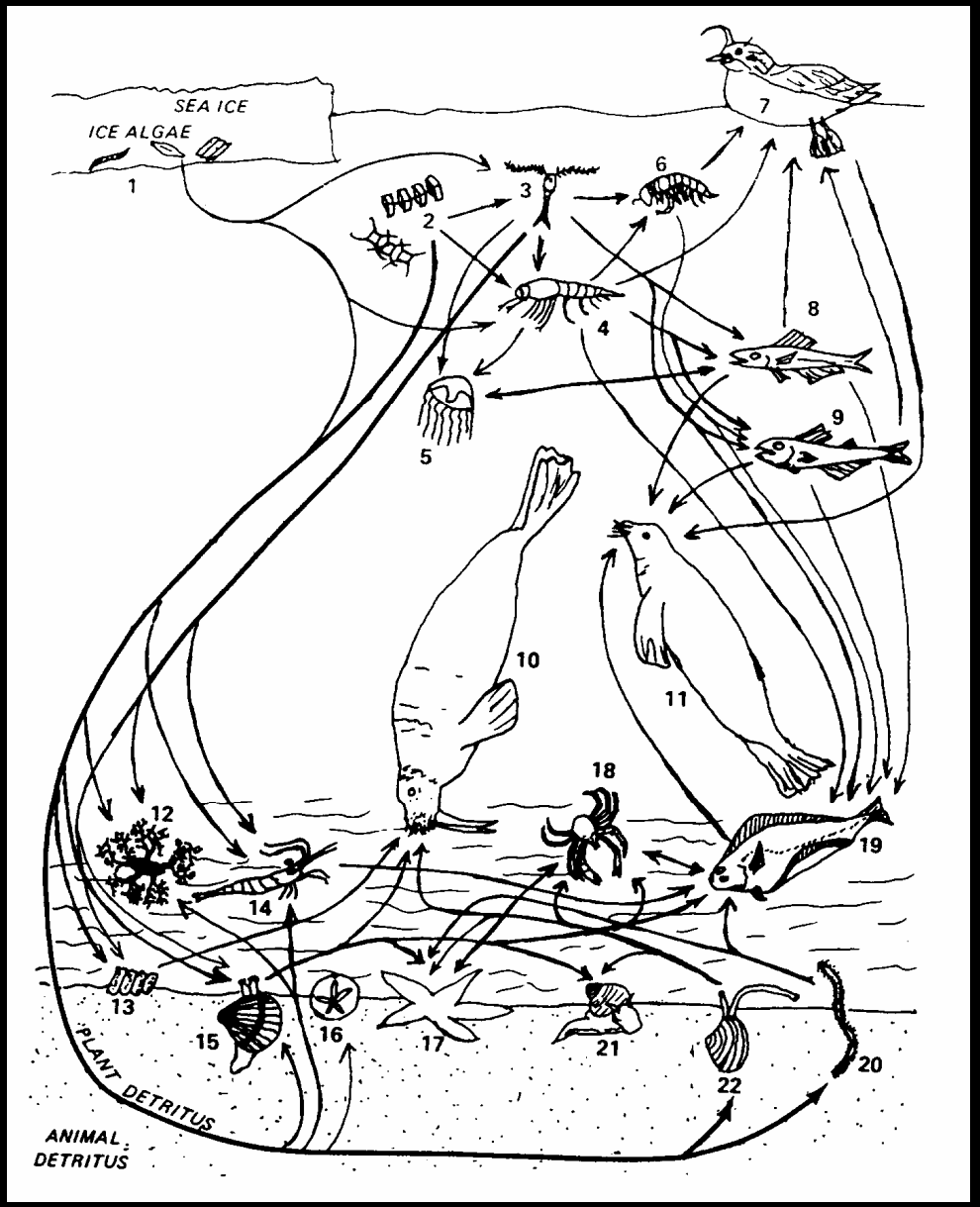
- Can’t have all species at high abundance all of the time
- Ocean Climate is a much larger driving force than many have previously recognized



Insights from Models

Models need data

- Diets & abundances
- Time series
- Unexploited species (forage fishes)
- Not necessary to know everything about everything



Conclusions

- Greatest value of ecosystem models is their ability to:
  1. synthesize available knowledge across all trophic levels
  2. identify important linkages and data gaps
  3. assess the possible consequences of fishing, climate change & other factors on components of the ecosystem

Conclusions

- Ecosystem models are not going to replace single species assessments
- Short-term (tactical) management will continue to rely on single species assessments
- Long-term (strategic) management will increasingly rely on ecosystem models to help determine what we want our ecosystems to look like, and to help us balance the tradeoffs between the needs of fisheries and different species

www.marinemammal.org
www.fisheries.ubc.ca