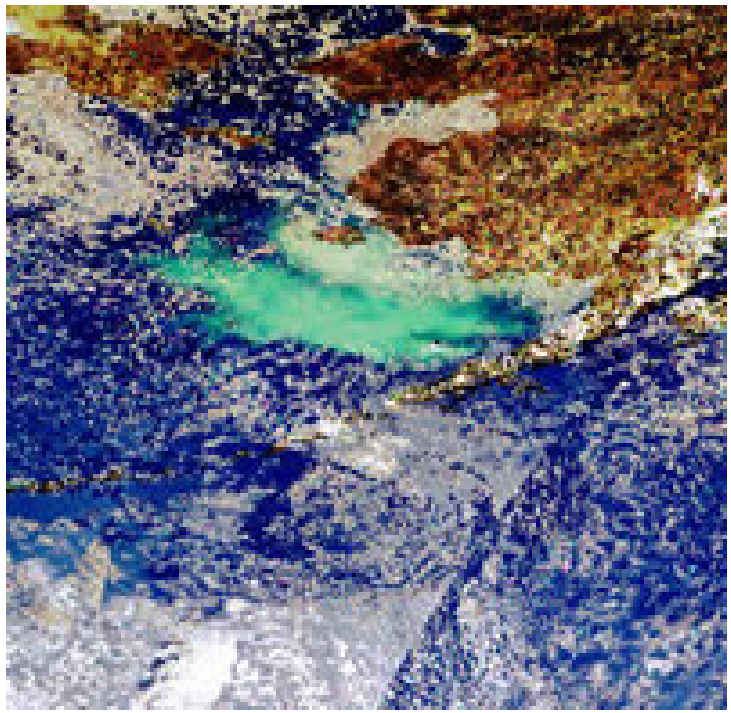
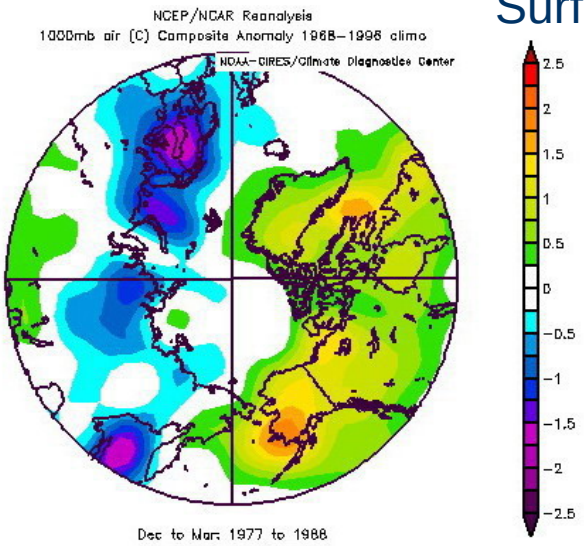
Bering Sea

- Important: Large Ecosystem, Pollock $2 B, 40 % of US catch
- Considerable data sources: Annual surveys and research
- First-order Knowledge Base: reviews and special issues
- Considerable management and support activities
- Not generally overfished: Dynamic ecosystem and climate change

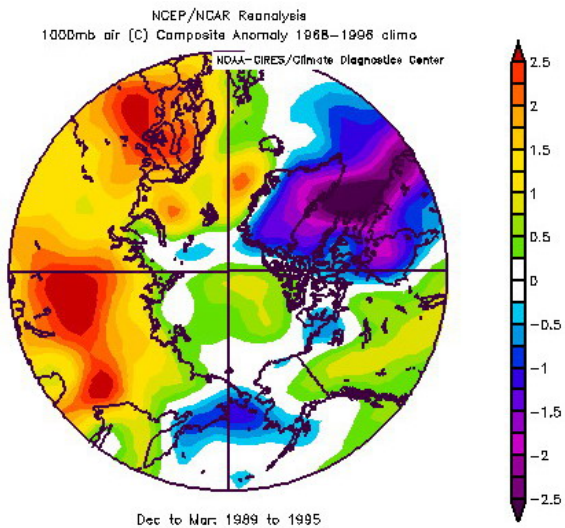


Climate Patterns

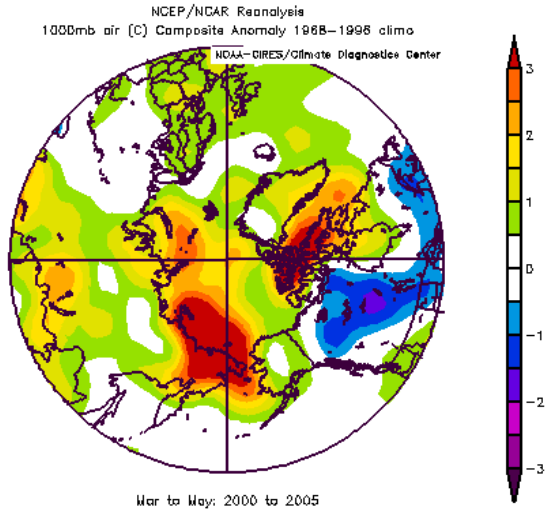
Surface Air Temperature Anomalies



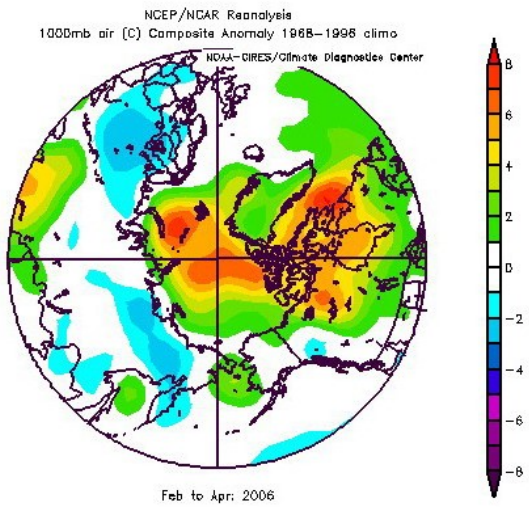
1977-1988 (PNA+/PDO)
Pacific North American



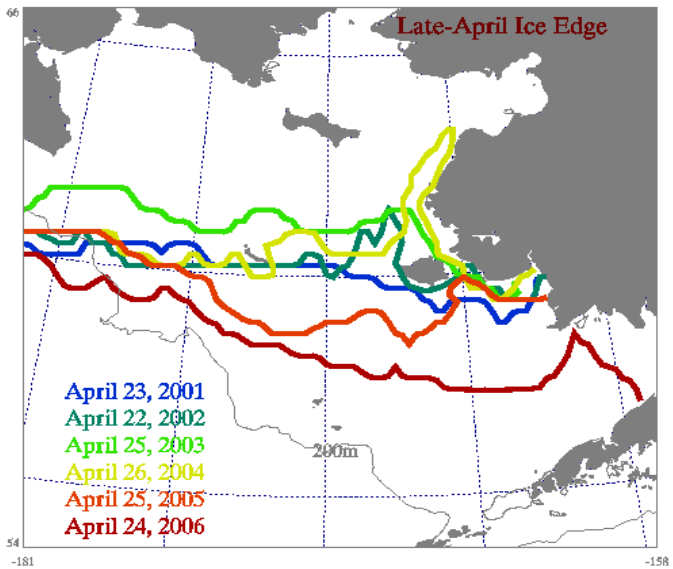
1989-1995 (AO+)
Arctic Oscillation



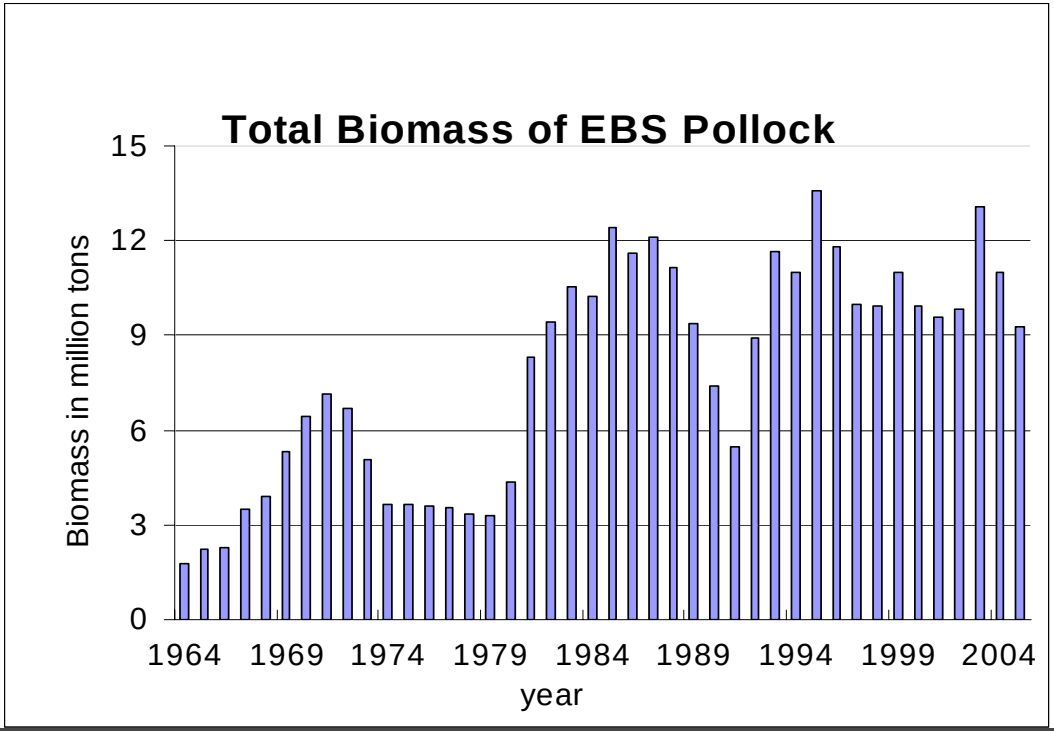
2000-2005 (Arctic Warm)

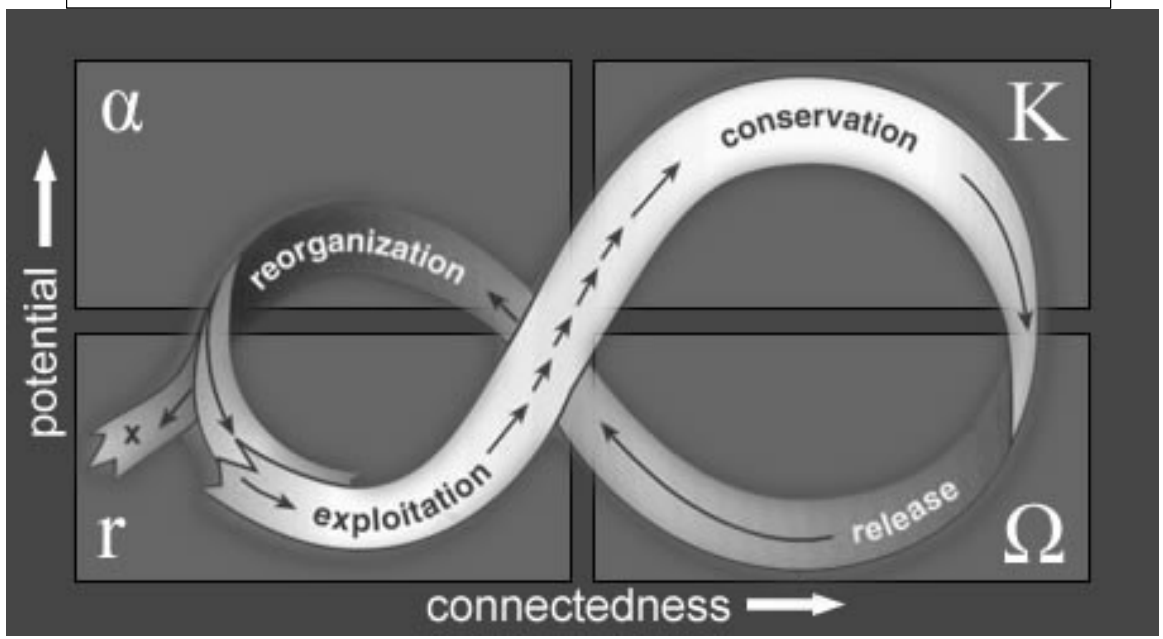


2006

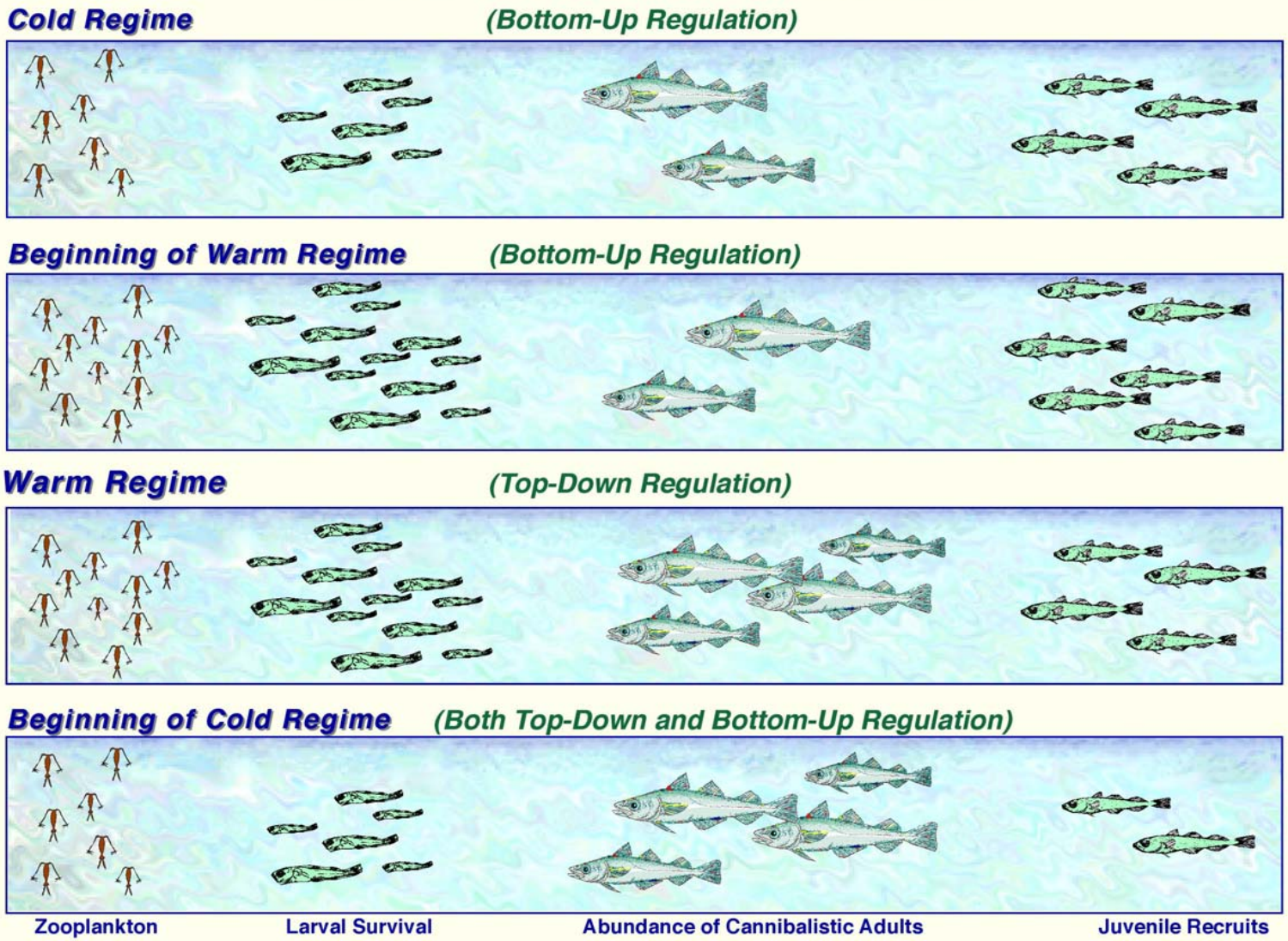


Time lags


Total Biomass of EBS Pollock
Biomass in million tons
15
12
9
6
3
0
1964
1969
1974
1979
1984
1989
1994
1999
2004
year

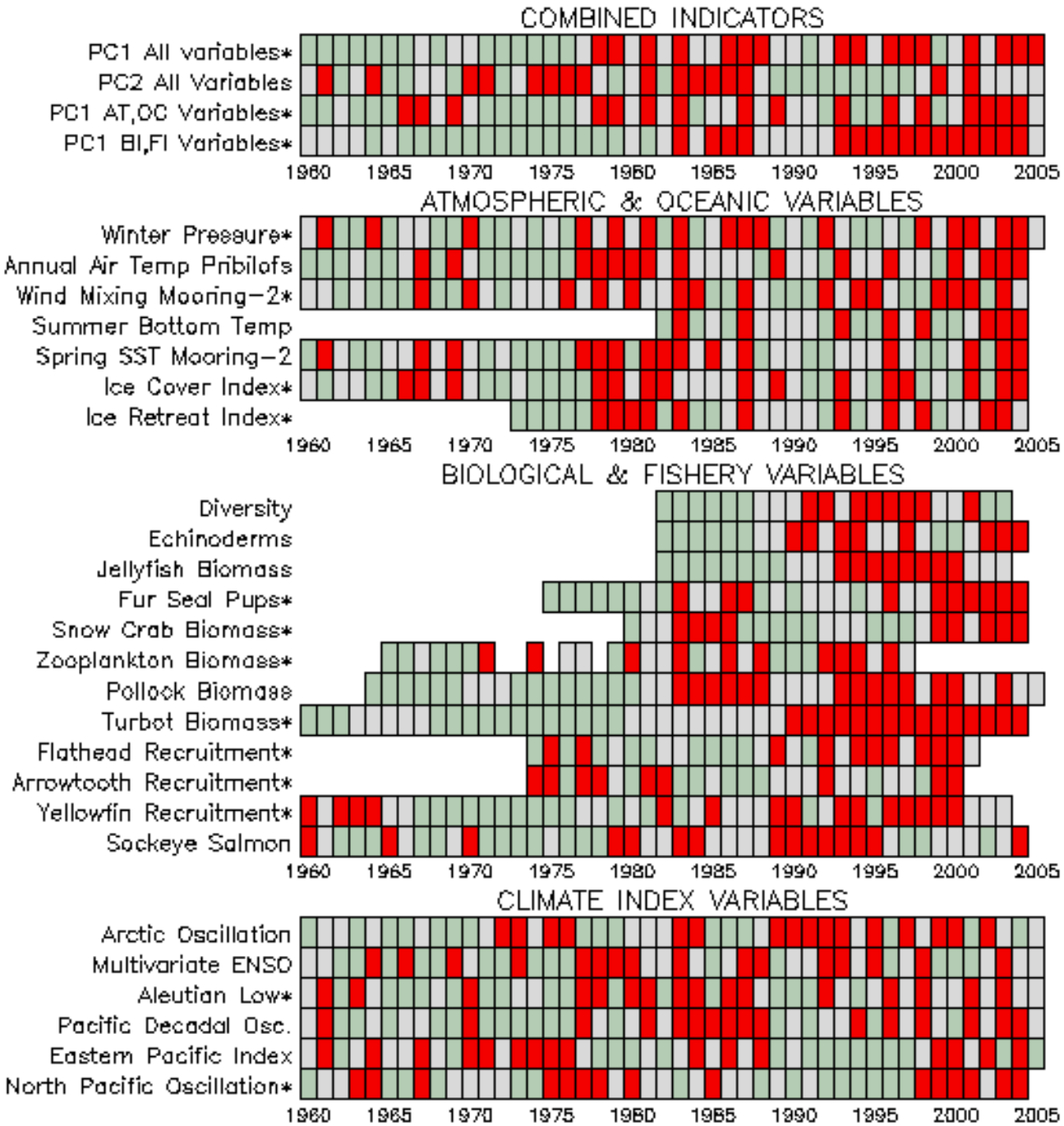

α
K
Ω
r
conservation
reorganization
exploitation
release
x
potential
connectedness

Oscillating Control Hypothesis

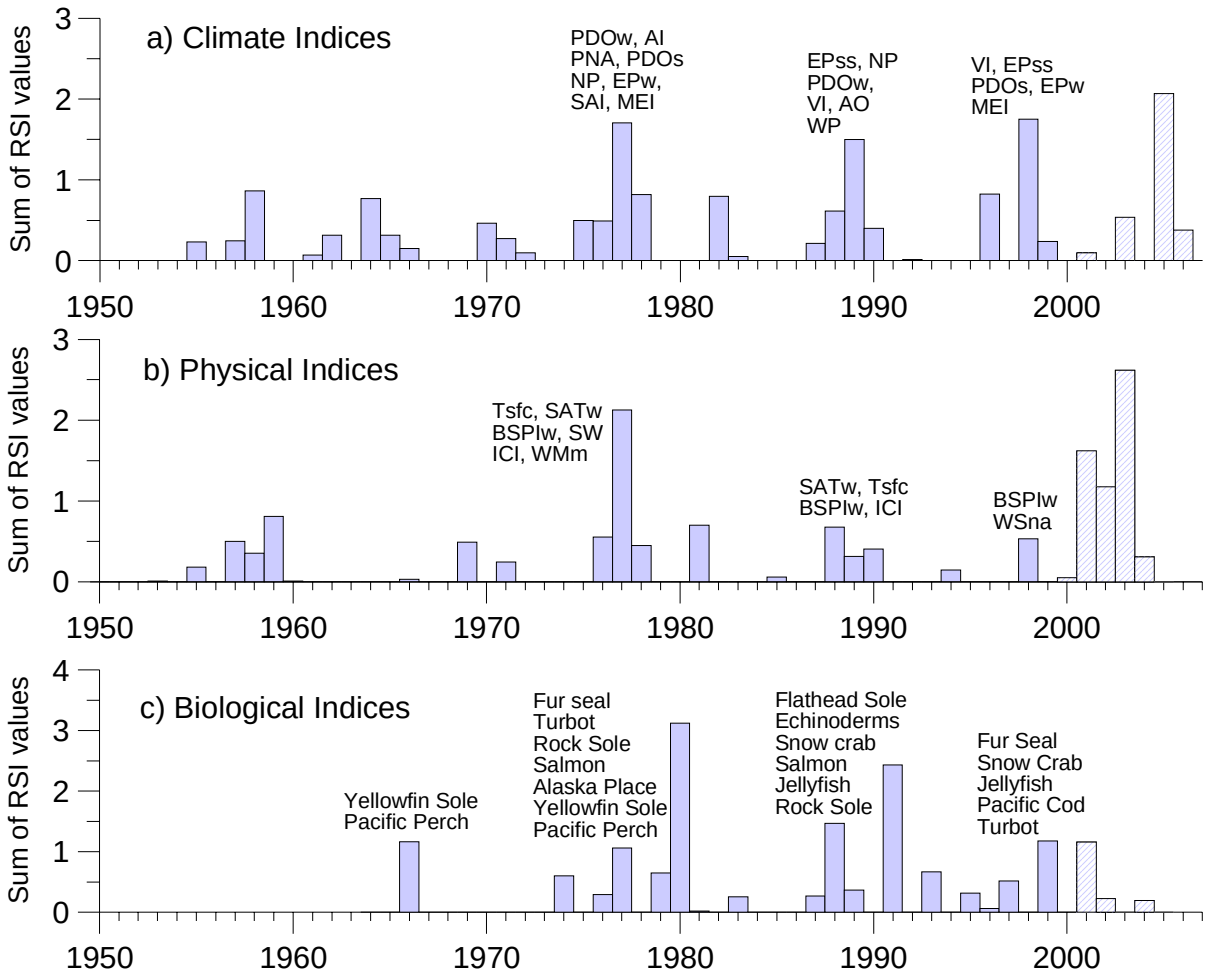


Hunt et al. (2002)

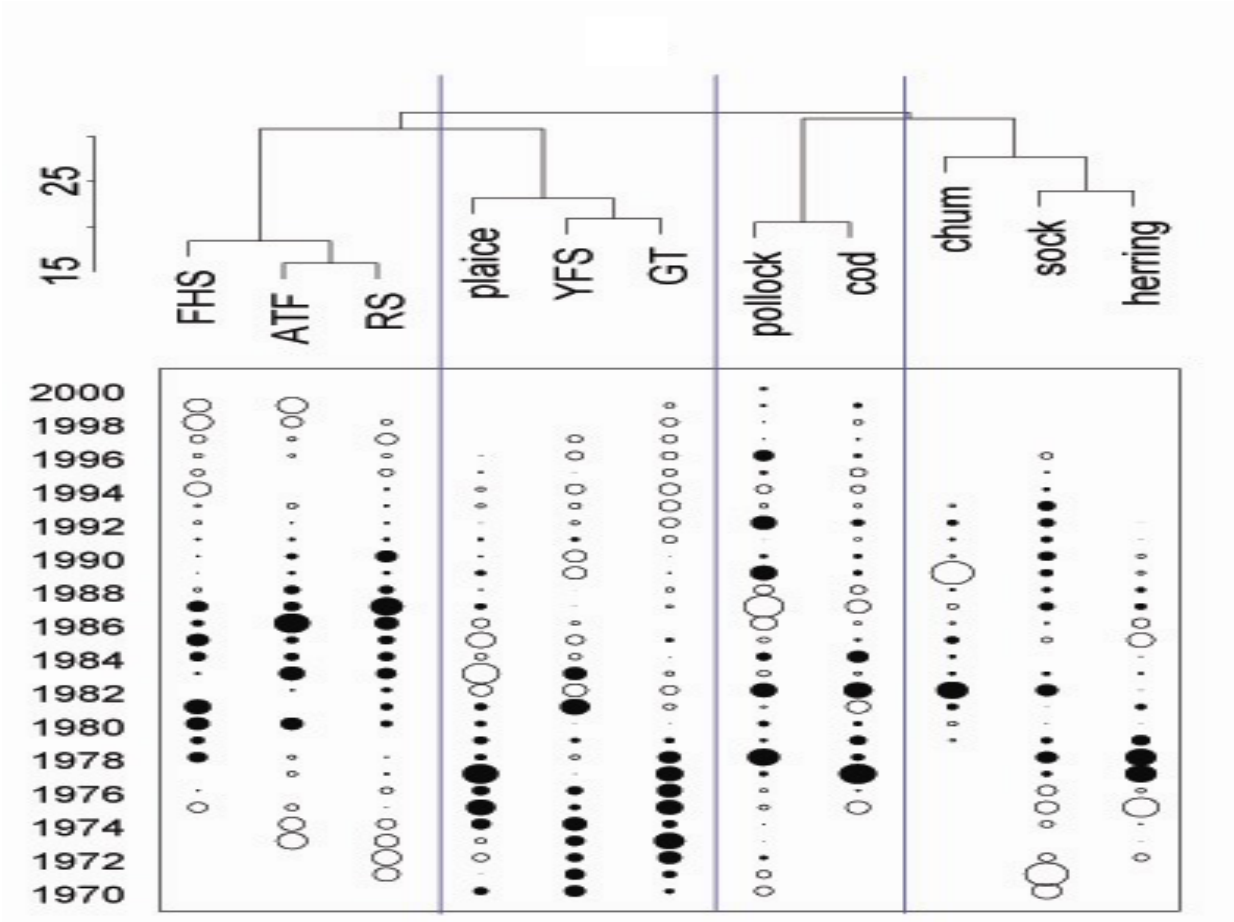
Bering Indicators



Multivariate look at indicators



Dendogram of Bering Sea stocks based on hierarchical cluster analysis of pairwise Manhatten distances among standardized recruitment



From Franz Mueter & Bern Megrey

Charge to Workshop

While understanding the limits from complexity, the ongoing efforts by NMFS and others, and the need for comprehensive reviews (300+ pages),

How do we summarized the state of the Bering Sea that will provide sensitive indicators (<10) of change?