The importance of considering the impact of regimes when establishing ecosystem-based approaches to fisheries management

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Ecosystem management will be related to regimes and regime shifts.

Regimes are persistent states in the climate and ocean environment that shift abruptly to new states on a decadal scale.
Regime indices…
Sandheads Wind Direction 1977-2002
(Oct-Dec proportion of total hours)

To the SE

To the NW
Slower growing fish in the first ocean year have lower survival over the late fall and winter.
Coho salmon in the Strait of Georgia

![Graph showing hatchery percentage and marine survival over years.](image)
Hatchery releases into the Strait of Georgia

![Chart showing hatchery releases into the Strait of Georgia from 1955 to 2005. The x-axis represents the year to sea, and the y-axis represents releases (x 10^6). Two lines are shown: one for Chum salmon (blue diamonds) and one for Coho salmon (red circles). The releases fluctuate over time, with peaks and troughs.](chart.png)
Dietary overlap – Amphipods, decapods and euphausiids

[Graph showing the percentage of dietary overlap for COHO, CHINOOK, and CHUM from 1997 to 2002.]
Management of the Strait of Georgia ecosystem would differ among regimes:

- **Pre-1977**: Productive Cool
- **1977-1989**: Productive Warmer
- **1990-1998**: less Productive Very Warm
- **1999-2007?**: Productive Warm
Conclusion #1

• It is important to note that we both ADD and REMOVE fish in our management of the Strait of Georgia. The impact of either of these management actions will differ among regimes.
Conclusion #2

Ecosystem-based management may eventually be the recognition that the productivity of an ecosystem changes abruptly on a decadal-scale. Ecosystem-based management may eventually be the cautious use of production from that ecosystem.