

Ecosystem Considerations in Fisheries Management

Linking Ecosystem-Based Management Goals with Ecosystem Research

Jennifer Boldt
Alaska Fisheries Science Center
Seattle, WA



Outline

- I. ECOSYSTEM ASSESSMENT
- II. ECOSYSTEM STATUS INDICATORS
- III. ECOSYSTEM-BASED MANAGEMENT INDICES AND INFORMATION

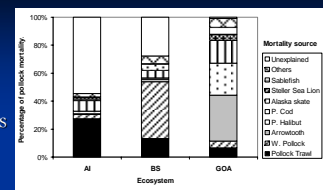
I. ECOSYSTEM ASSESSMENT

Organization:

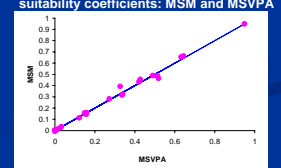
- Recent Ecosystem Changes in the Bering Sea and Aleutian Islands
- Recent Ecosystem Changes in the Gulf of Alaska
- North Pacific Assessment (focus on Alaska)
- **Multispecies statistical model**
- **Ecosystem modeling results**

Model Progress (Aydin and Jurado-Molina)

- BS, GOA, and AI ecosystem model documentation and web access to data and results nearing completion
- Completion of prototype multispecies statistical model



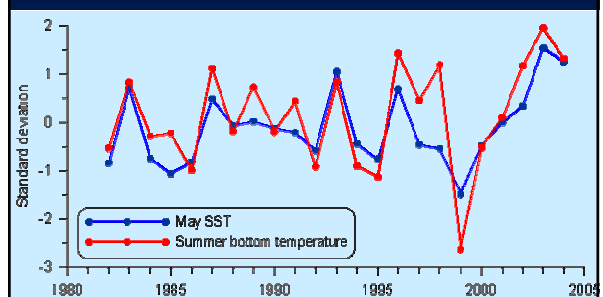
Comparison of pollock suitability coefficients: MSM and MSVPA

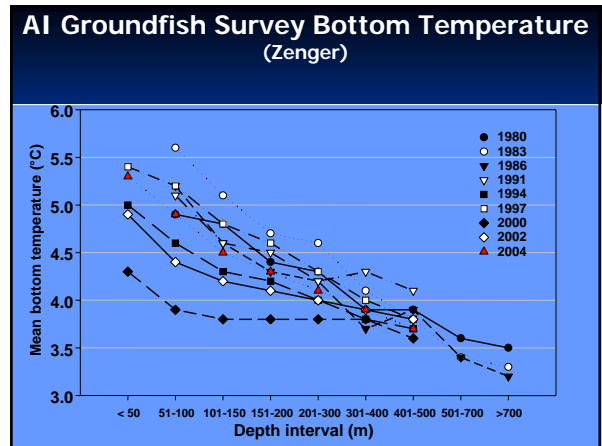
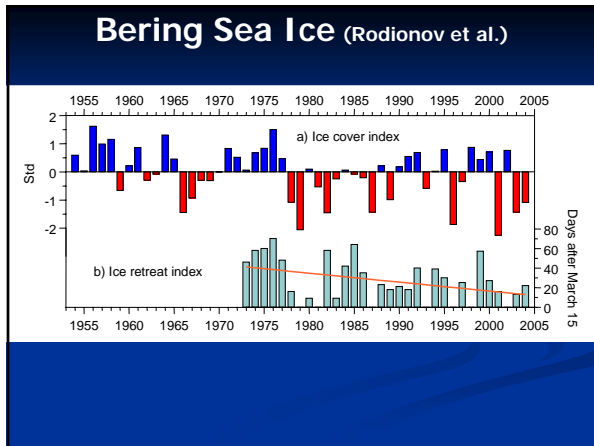


II. ECOSYSTEM STATUS INDICATORS

- > Physical Environment
 - GAK 1 MLD; EBS temp. and ice; drift trajectories; GOA pollock survival indices
- > Habitat
 - AI and BS HAPC; Updated habitat research
- > Forage Fish
 - AI and BS
- > Herring
 - PWS herring
- > Groundfish
 - R/S regime shift analysis; flatfish distribution and the cold pool
- > Benthic Communities + Non-target Fish Species
 - AI and BS Misc. sp.; Grenadiers; crabs
- > Marine Mammals
 - Updated
- > Seabirds
 - Updated

BS Temperature (Rodionov et al.)

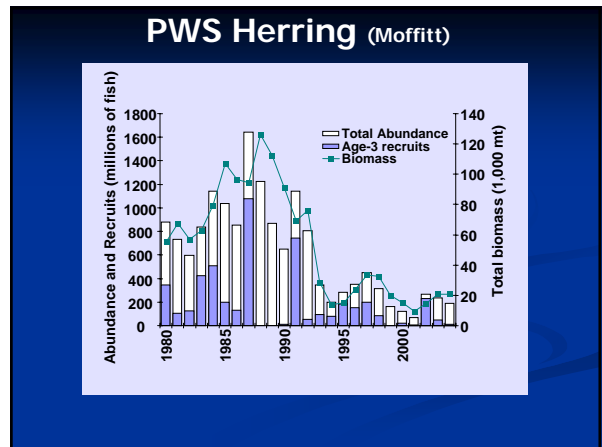
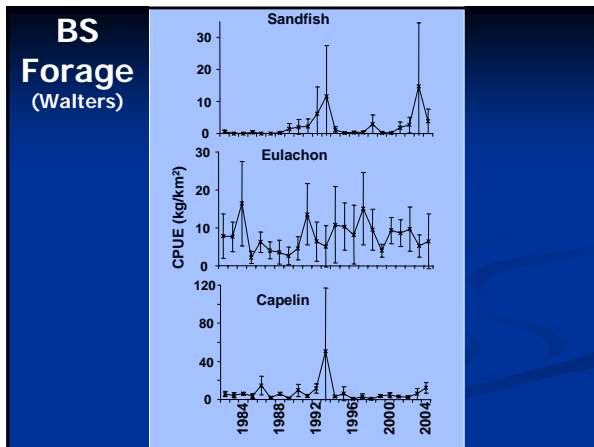
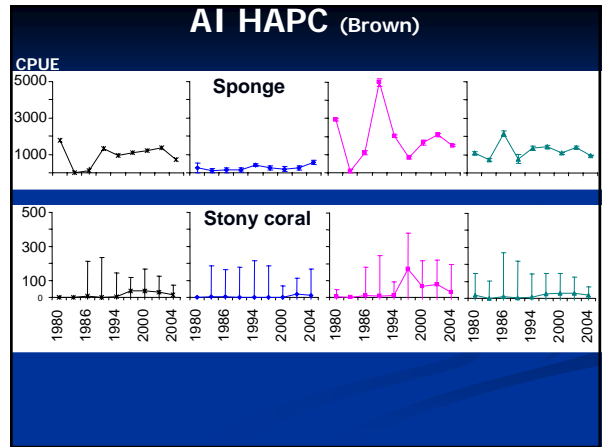


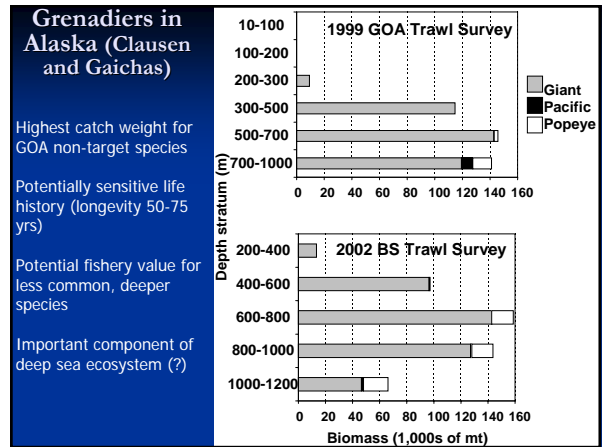
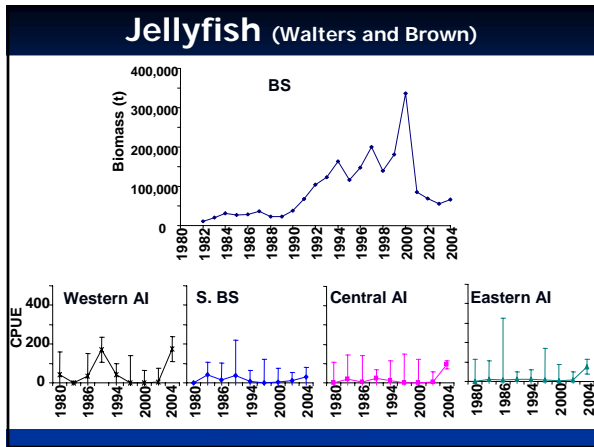
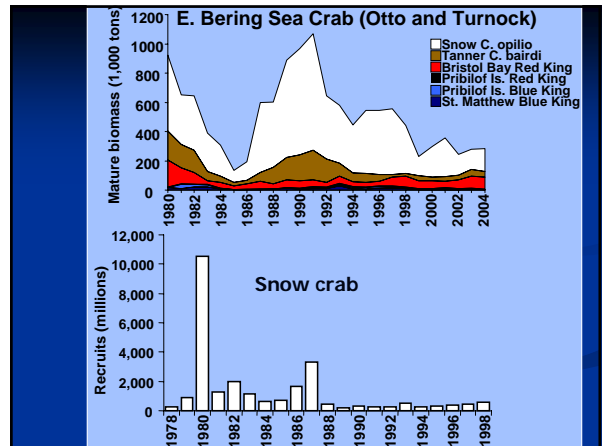
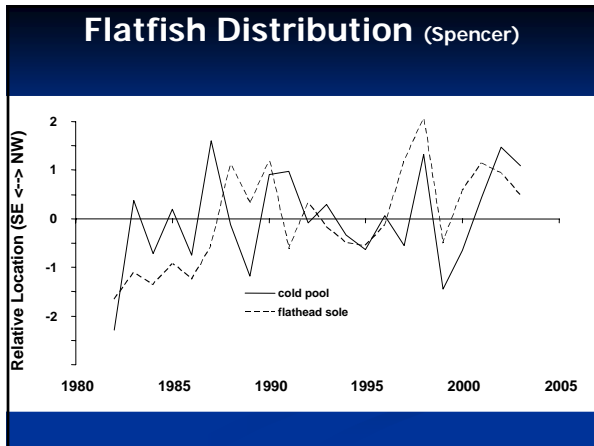


Habitat Research

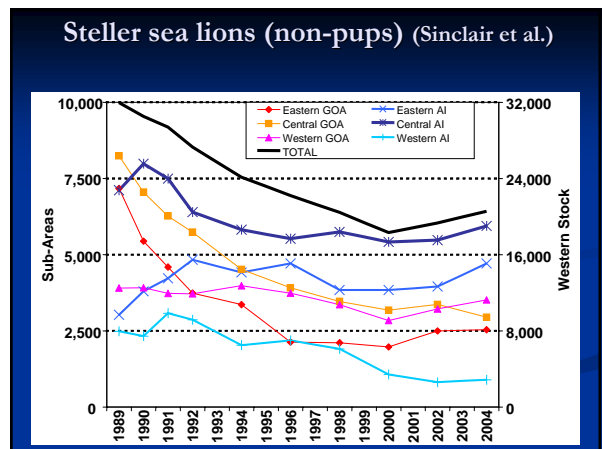
Included to help inform assessment scientists and public about research results and progress

- Table of habitat research projects
- 4 summaries of EFH projects
- 17 research project summaries of Effects of Fishing Gear on Seafloor Habitat
- List of habitat research-related publications

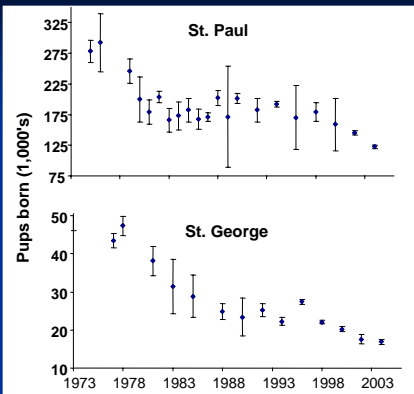




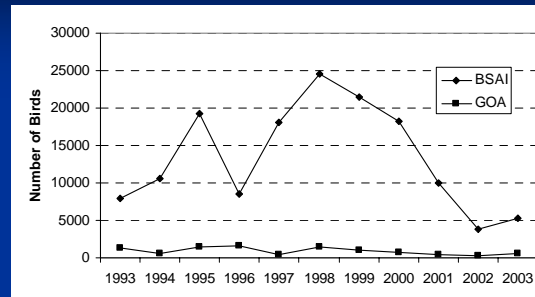
- ### Recommendations
- Data analysis
 - Examine catch rates from ABL longline survey
 - Work up maturity and age samples collected to date
 - Data collection
 - Maintain deep survey strata, extend deeper?
 - Identify grenadiers to species in fisheries
 - Management
 - Monitor catches: total biomass, spatial distribution, sex ratio
 - Monitor survey trends in same things
 - Purpose of "assessment" is to put grenadiers on the radar...



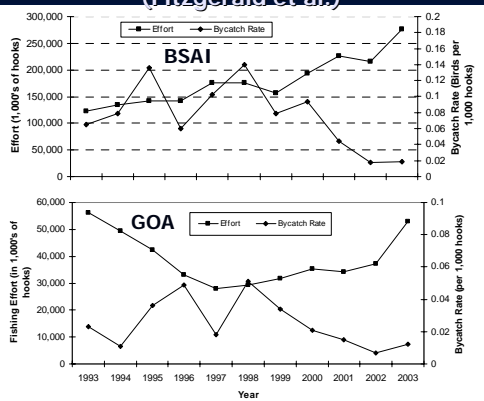
N. Fur Seal Pups (Sinclair et al.)



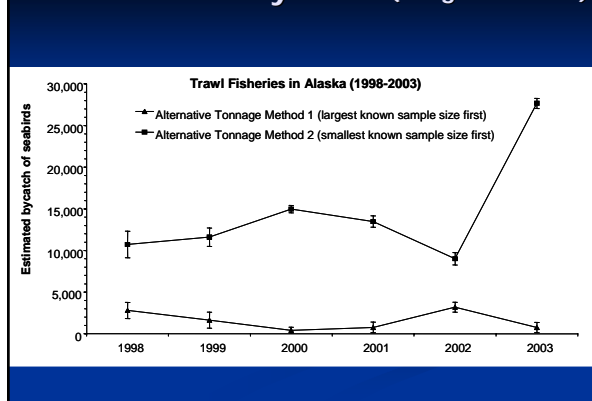
Seabird longline bycatch (Fitzgerald et al.)



Longline effort and seabird bycatch (Fitzgerald et al.)



Trawl seabird bycatch (Fitzgerald et al.)



Future

- Timing of Ecosystem Considerations
- Include model projections in assessment including climate scenarios and suites mngt alternatives
- Bring lower trophic level models into assessment

Extra slides

Recent Changes

1999-2002

- Summer and annual PDO below average
- 3 other atmospheric indices show shift
- SLP reversed signs
- Decreased sea ice cover in BS
- Increased shrimp CPUE in GOA
- Strong 1999 yearclass of GOA pollock and cod

2003

- El Nino – BS and GOA warm

2004

- BS – warm; GOA- average

I. ECOSYSTEM ASSESSMENT

Goals:

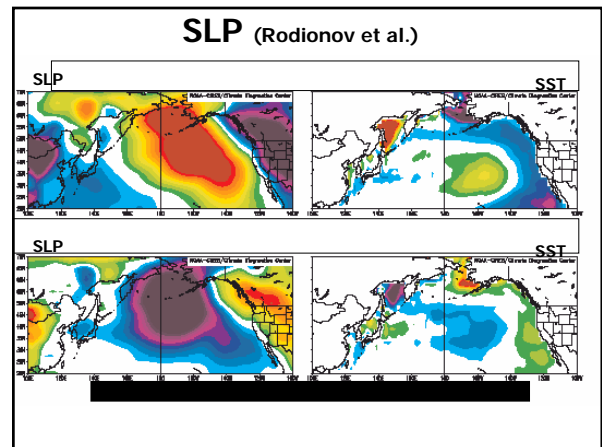
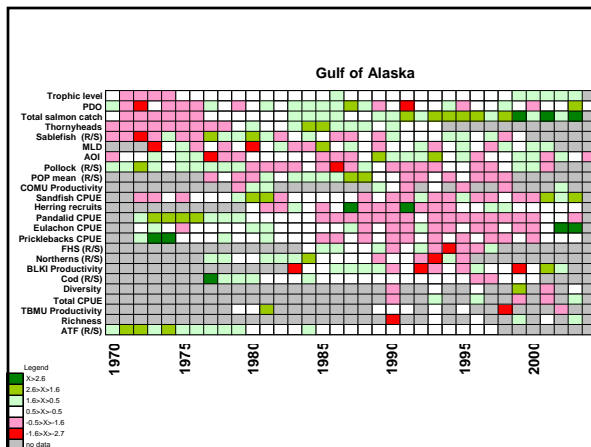
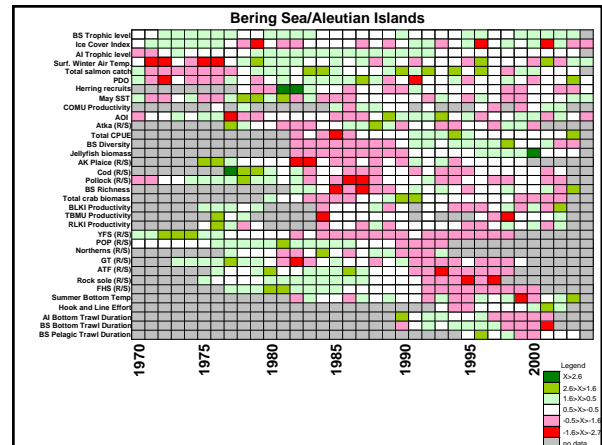
- Summarize historical climate and fishing effects on BSAI and GOA (using Ecosystem Status Indicators section)
- Summarize possible future effects of climate and fishing on ecosystem structure and function (using a variety of models)

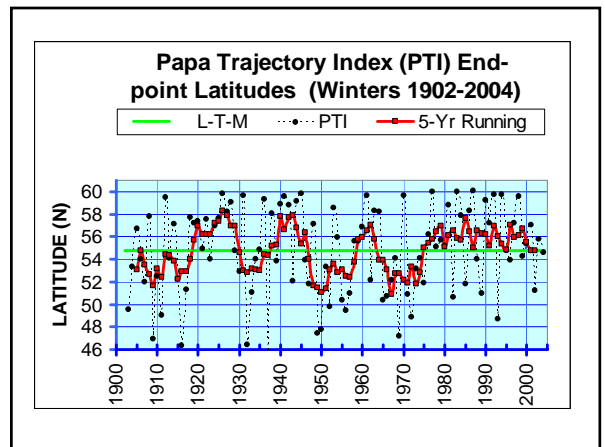
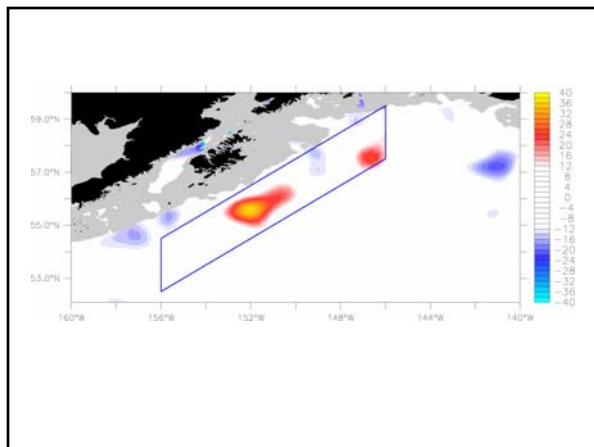
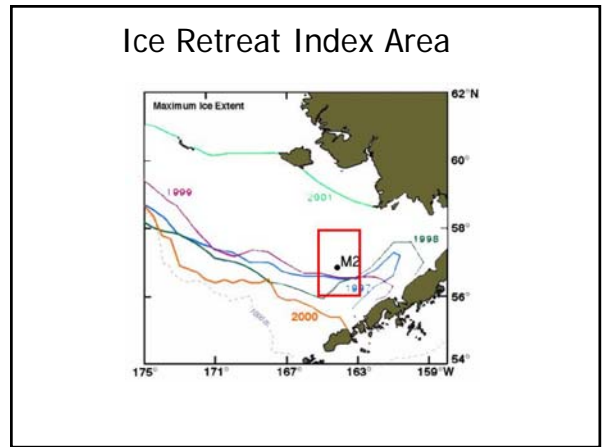
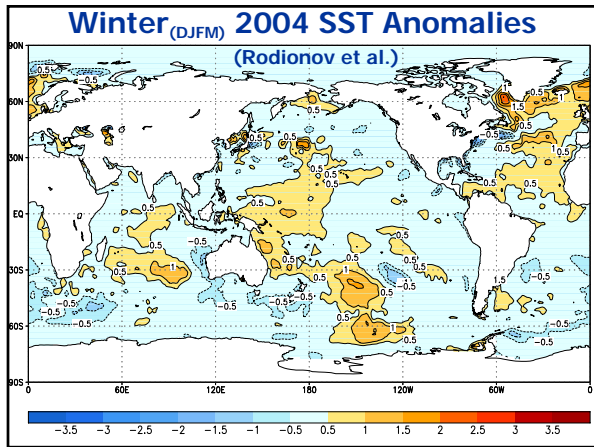
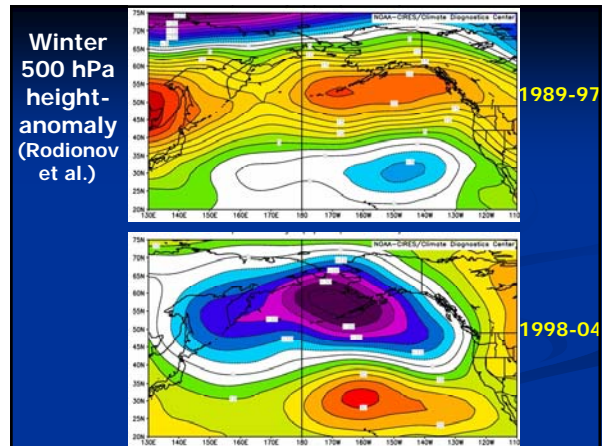
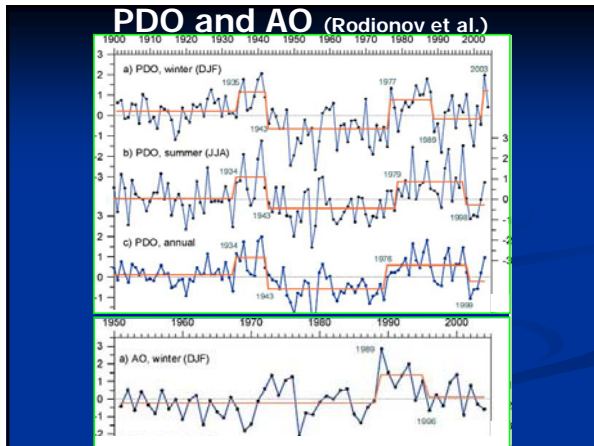
Focus for this draft:

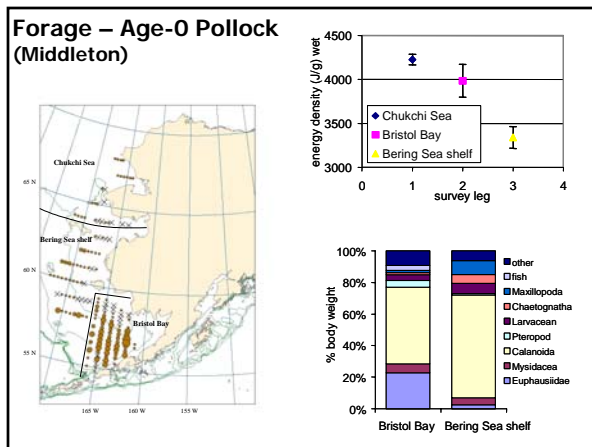
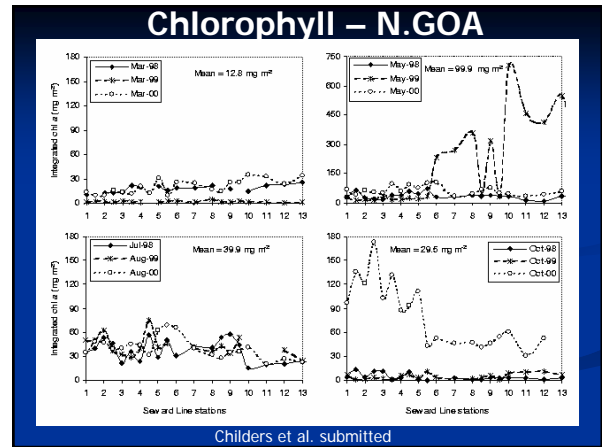
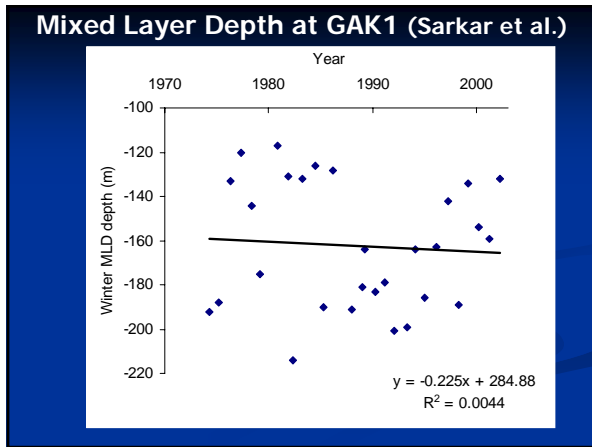
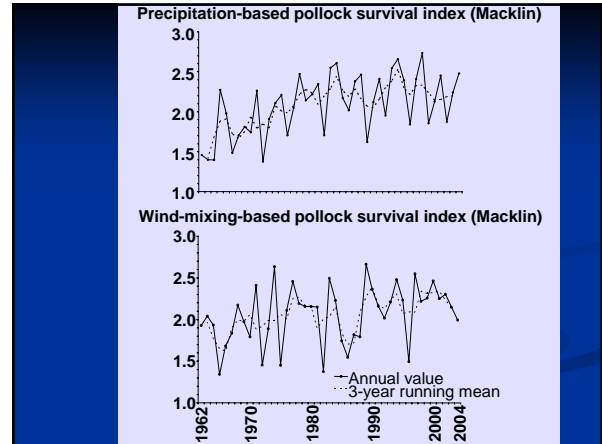
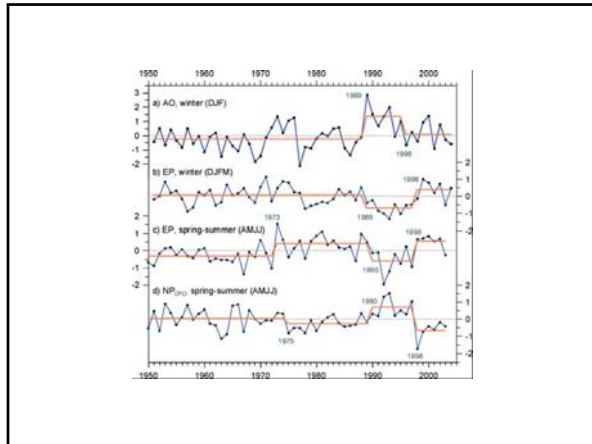
- Historical responses of ecosystem components to climate regime shifts
- Expert judgement on the near-future state of climate
- Advances in Developing Predictive models

III. ECOSYSTEM-BASED MGNT. INDICES AND INFORMATION

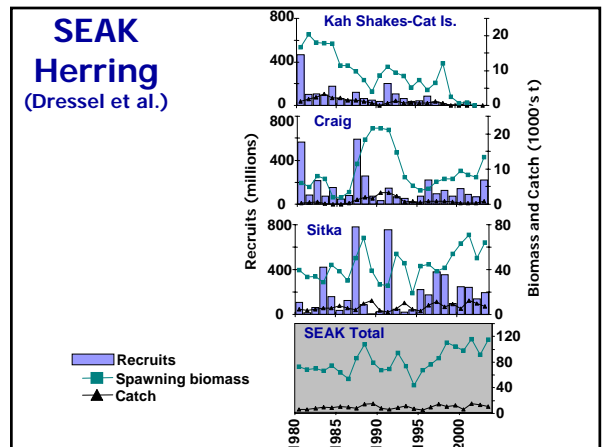
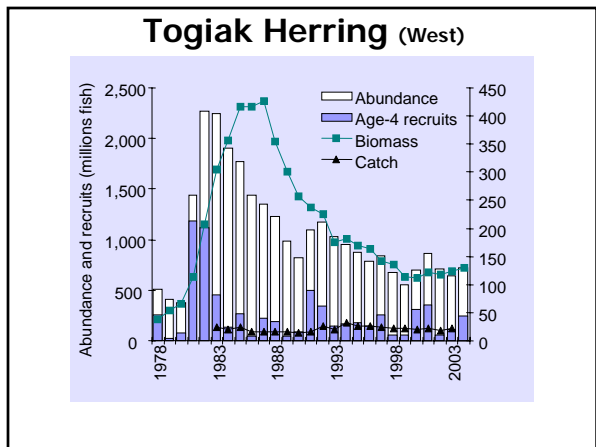
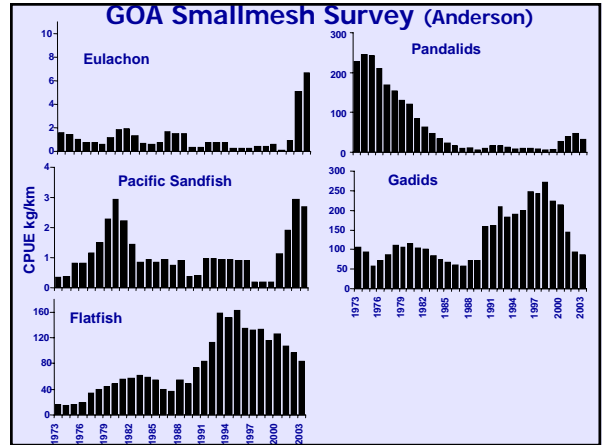
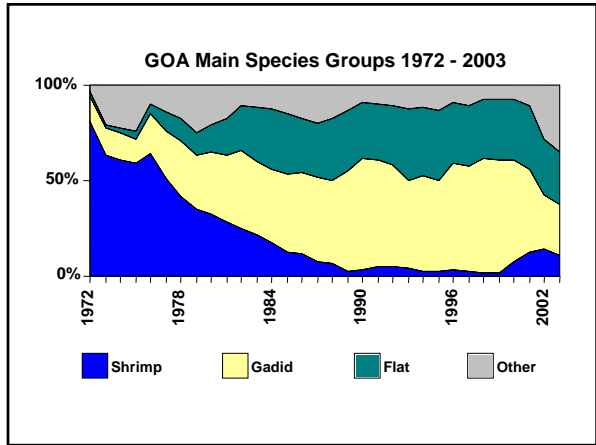
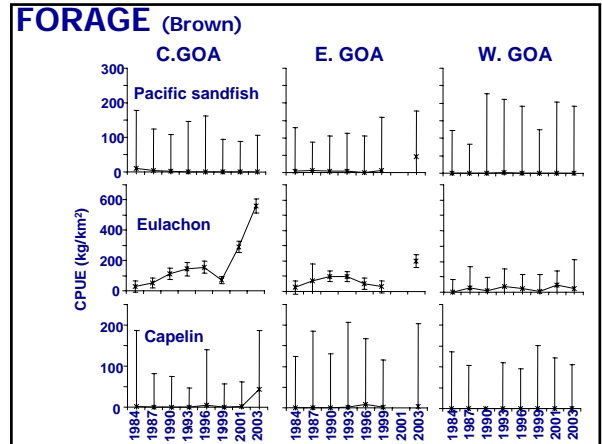
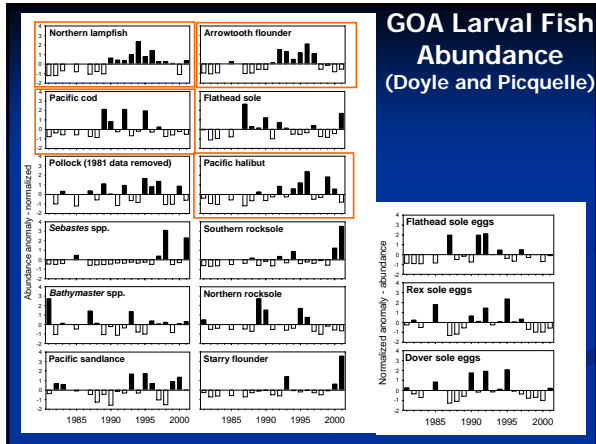
- Maintain Diversity
(bycatch, prohibited species, discards, non-target)
- Maintain and Restore Fish Habitats
(areas closed, effort)
- Sustainability
(trophic level of catch, stock status, size spectrum)
- Humans are part of ecosystem
(fleet composition, overcapacity programs)

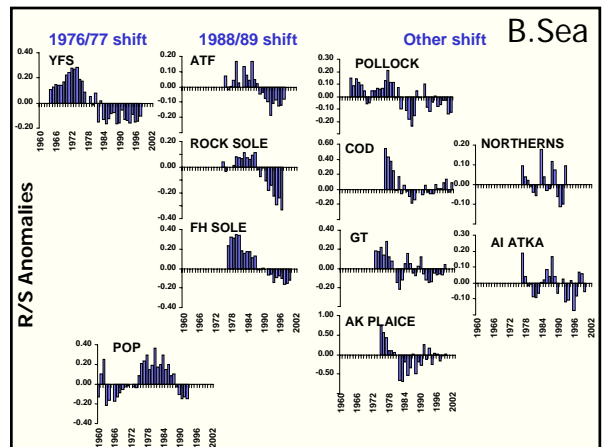
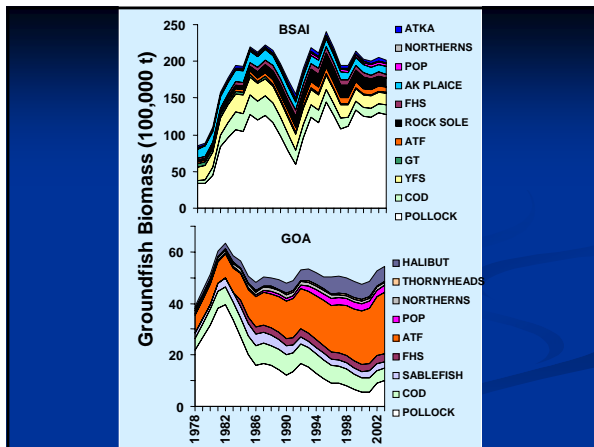
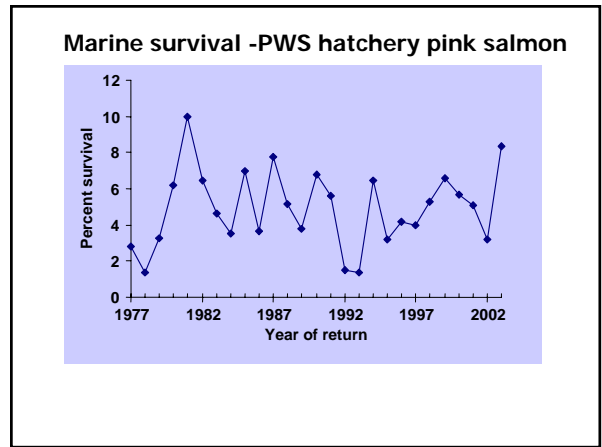
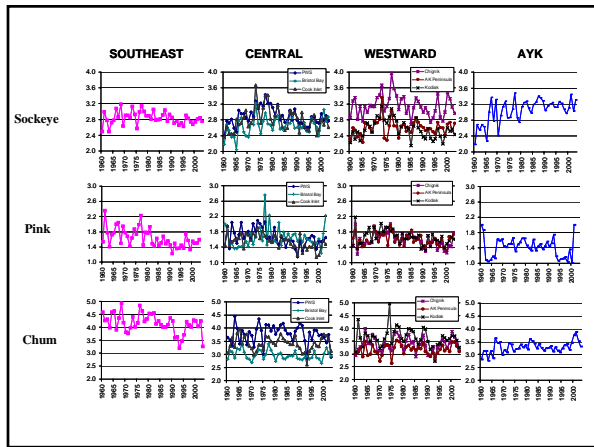
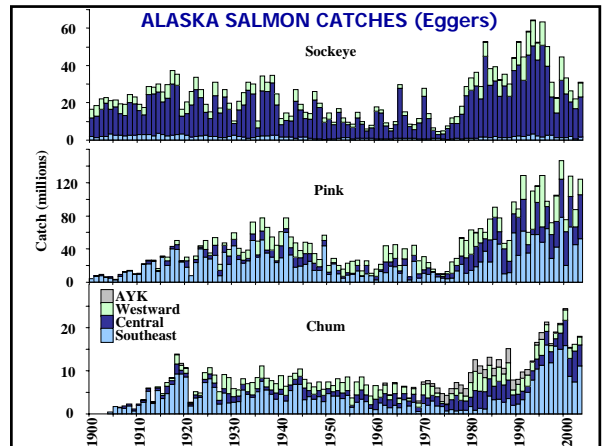
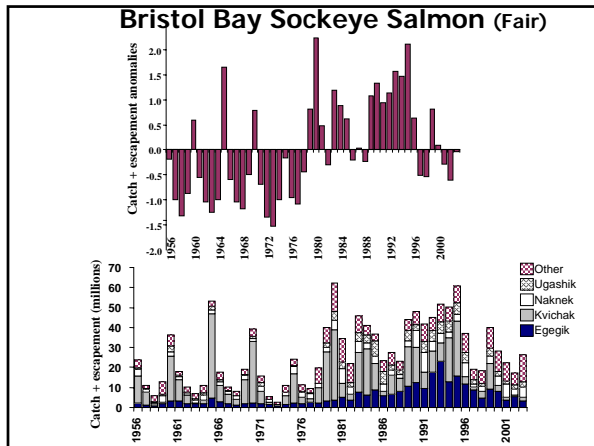


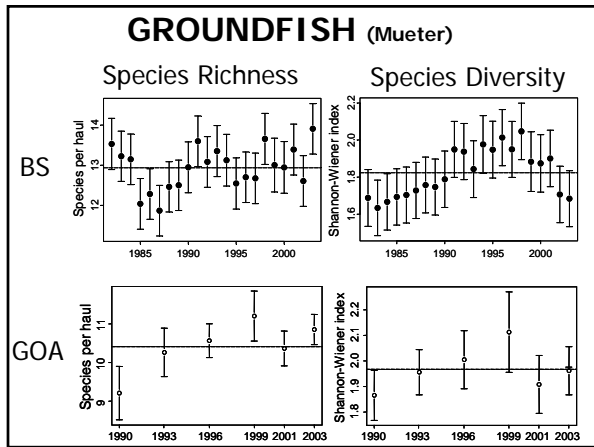
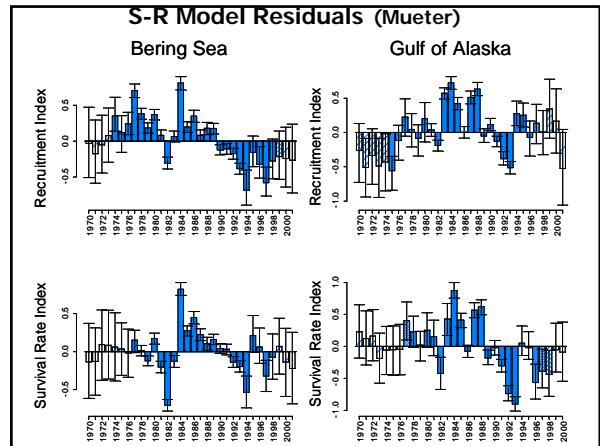
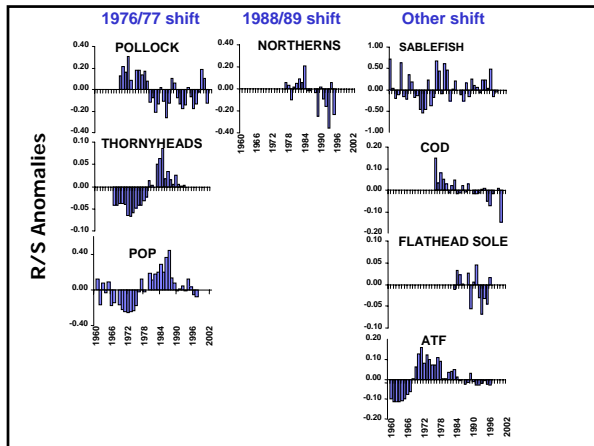




- ## Forage
- GOA spring ichthyoplankton (FOCI)
 - BS age-0 pollock (BASIS)
 - Bottom trawl surveys
 - Herring (ADFG)
 - Small mesh surveys (ADFG/NMFS)







- Alaska Native Traditional Environmental Knowledge of Climate Regimes (Lazrus)**
- 1947-1975
 - Earlier and faster melt of sea ice
 - Declines in spotted seal populations
 - Rising sea levels and coastal erosion - impact sculpin harvest
 - 1976/77-1988
 - Increased wind frequency and intensity
 - Increased temperature
 - Ice melted earlier
 - Currents seemed to have shifted
 - 1989-1998
 - Significant decline in seabird populations in 1998
 - Decrease in Yukon River salmon populations
 - Decrease Mckoryuk Bay clams
 - Ice formation delayed until early to mid-December (vs. October in previous years)
 - Early spring weather 1996-98
 - Poor health of walrus and young spotted seal populations

