Spatial Structure/Connectivity not independent of non-stationarity

- Initial OM conditioning to assessment?
- Design OM to admit multiple spawning populations?

Genetic evidence for stock structure?

E.g. Spatially disaggregated with single spawning population
2. Data Error assumptions?

- How to quantify CPUE/survey relationship with abundance?
  - e.g. Conflicting trends in Abundance trends
  - How large of a trend is plausible? Fisheries dependent q’s Increase over time.

- Should we be exploring decision rules based on emerging observation methods?
Some evidence of dynamic B0 changes

Source: Berger 2017 (CAPAM)
3. Non-stationary production dynamics?

- Recruitment / M / Growth?

4. Management tactics

- Assume TAC option can be realized for each species?
  - Multi-species nature of the fisheries
  - Time/Area Closures and effects
Issues and Challenges in General

1. Design:
   i) Operational model Conditioning (Assessment Model based Ecosystem based, Other)
   ii) MP’s tested (empirical, model based, other)
   iii) How to deal with temporal trends/non-stationary dynamics in the OM’s and MP’s?

2. Management:
   I. Clear active management
   II. Allocation between groups specified.

3. Capacity:
   I. Capacity in region to understand work and implications of MP
   II. Getting clear concise objectives from the Council along with risk thresholds

4. Data Quality and control (M&E)
Non-stationary dynamics Issues

- a) Synthesis of what is meant by adjusting HCRs in changing environments, where this is done, and why?
- b) What are the best practices for incorporating EBFM into developing HCRs and what is the role for MSE in determining those practices?
- c) Should we adjust HCRs as environmental conditions change, or design an HCR that is robust to changing environmental conditions?
- d) How precise does our understanding of the impacts of environmental variability on the productivity of each stock in an FMP have to be in order to successfully adjust the HCR to achieve the management objectives, and what are the costs of obtaining this precision relative to benefits?
Additional questions

- e) In the absence of explicit ecosystem modeling, is there a robust uncertainty level to incorporate into an MSE operating model for impacted metrics such as natural mortality, recruitment, etc?
- f) Are the simple fixed-exploitation rate rules developed by Ana Parma and Carl Walters just as robust as dynamic rules?
- g) Can we provide guidance on dynamic reference points (in reality both spatial and temporal aspects) when it comes to MSEs/assessments, and do/should these differ depending on factors such as species life history?
- h) What time frames for catch advice are appropriate to keep pace with environmental change?
- i) Can/how can we tease out the effects of "environmental" (including climate) change vs. more directly human-induced changes in dynamic (or even recalculated static) reference points, or at least discern which might be fully or partially reversible?
- j) Should the problems or potential problems in the implementation of an MSE-based HCR that could affect the outcomes predicted by the models be considered or evaluated by the group that develops the MSE?