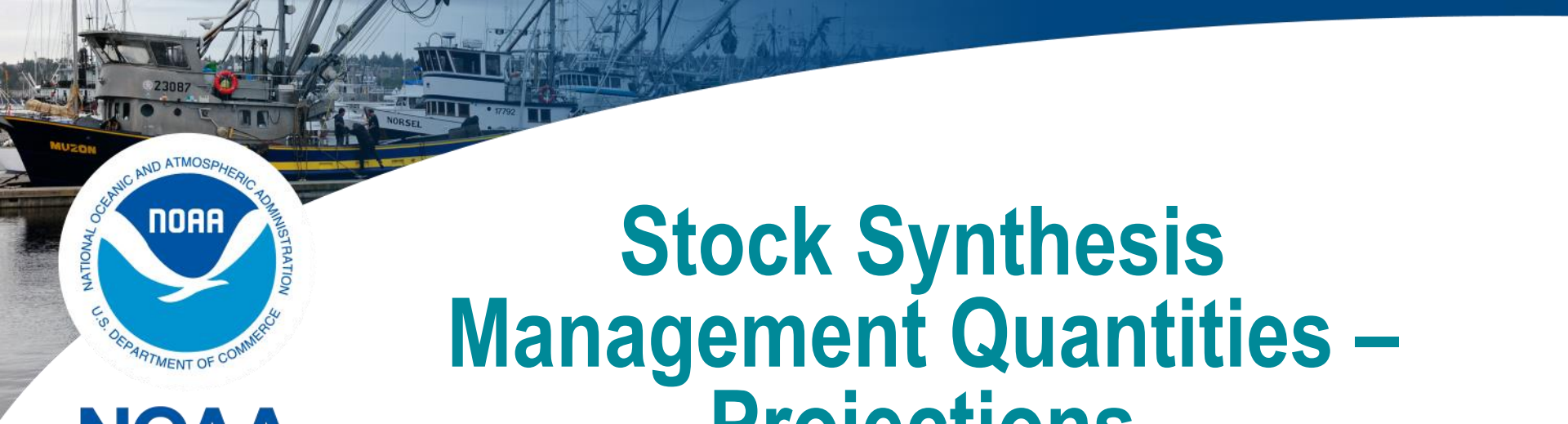


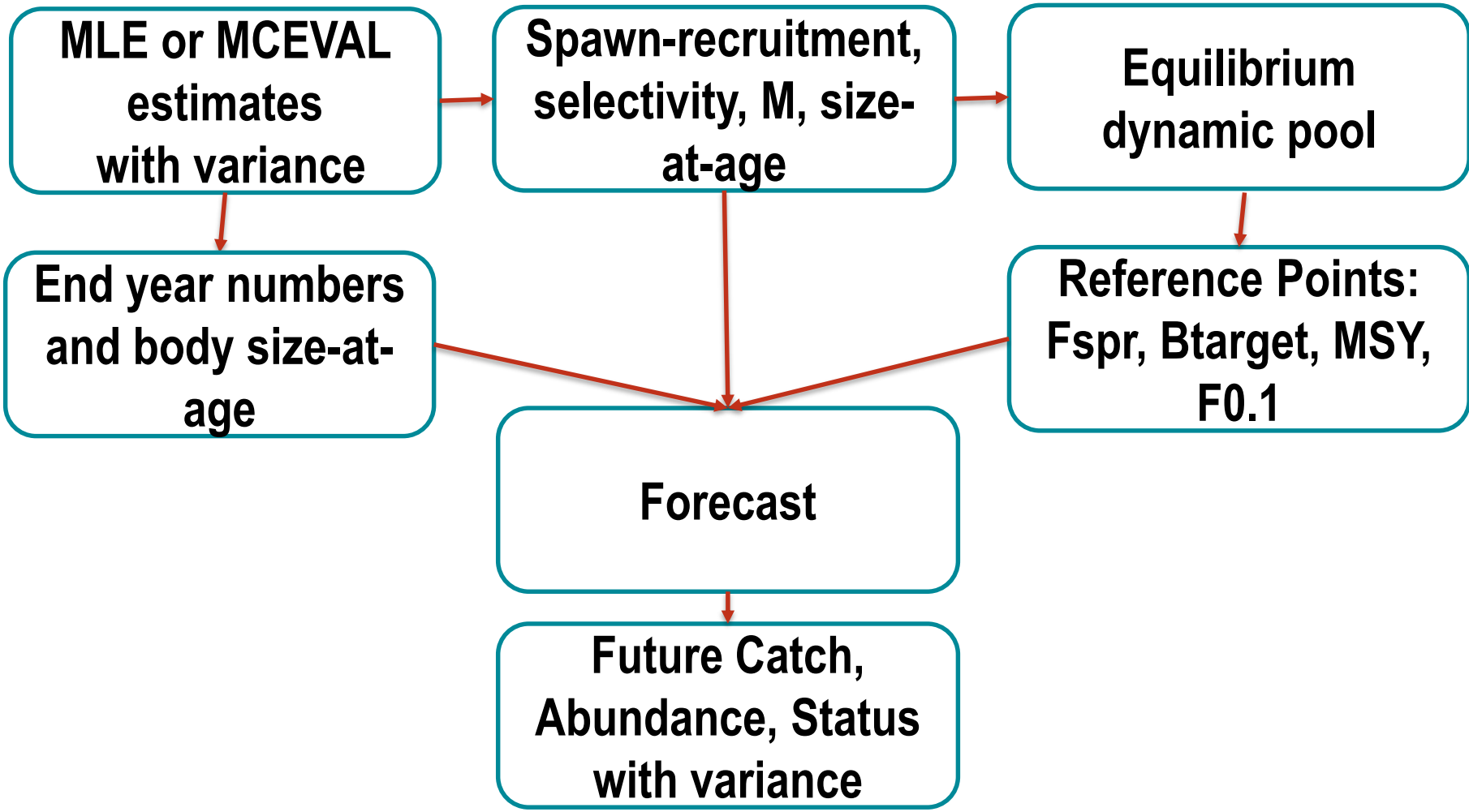
NOAA FISHERIES

Stock Synthesis Management Quantities – Projections

Richard Methot

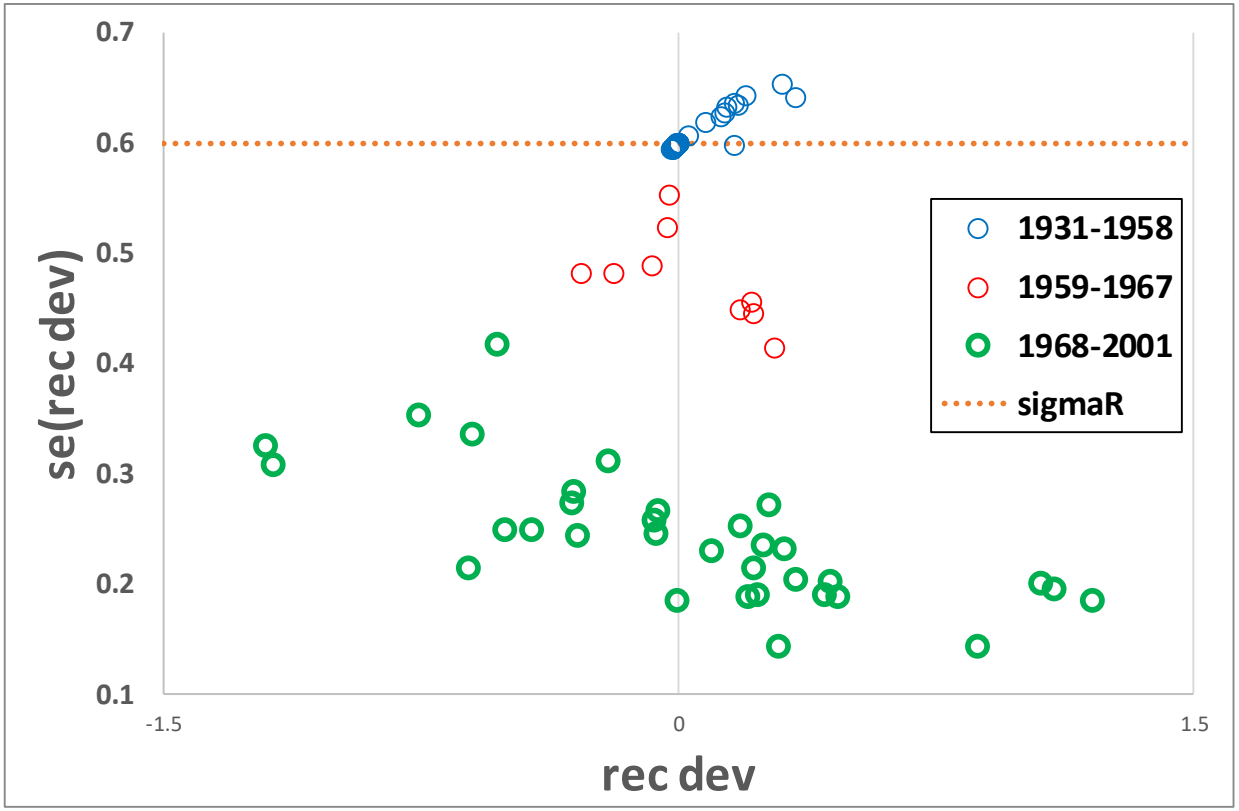
NOAA Senior Scientist for Assessments

SS Program Flow



Aside: comment on recdev estimation

- SS as OM simulates population beginning 1931; non-catch data begin 1971
- SS as EM estimates spawn-recruitment curve and recdevs begin 1931
- Se(recdevs) is basis for bias adjustment
- Strong recruitment estimated more precisely (log-scale) than weak



Find Reference Point F's

- Based on equilibrium, per recruit calculations; same as initial equilibrium population
- User control on relative F among fleets
- User control on range of years to average for biology, spawn-recruit parameters, selectivity, etc.
- Iterative search over fixed number of iterations to find:
  - F_{SPR}, $F_{BTARGET}$, $F_{0.1}$, F_{MSY}
  - Results stored as sd_variables
- Also does global MSY search using knife-edge selectivity

Reference Point Calculations

	B31%		SPR_42%		MSY	
	value	se	value	se	value	se
SSB	15642	1914	15476	4377	16336	5144
SPR	0.423	0.095			0.435	0.150
F	0.245	0.091	0.248	0.005	0.235	0.137
Catch	6907	1827	6904	1955	6913	1773
Catch_retained					6913	1773
B_MSY/SSB_unfished					0.326	0.069

Three Stages of Forecast

- Stage 1 – find annual catch limits
- Stage 2 – find annual catch targets
- Stage 3 – calculate effect on stock of catching the catch target

Three Stages of Forecast

- Stage 1 – find annual catch limits
- Stage 2 – find annual catch targets
  - Harvest control rule, fixed inputs, allocations and constraints
  - No recruitment deviations
  - Store catches as a time series of future quotas
- Stage 3 – Feedback
  - calculate effect on stock of catching the catch target

Three Stages of Forecast

- Stage 1 – find annual catch limits
- Stage 2 – find annual catch targets
- Stage 3 – calculate effect on stock of catching the catch target
  - Use stored quotas
  - Turn on stochastic recruitments and implementation error on the catches
  - Calculate future F and Biomass
  - Express as ratio of F/Fmsy and B/Bmsy with variance

Demonstrate Forecast

- **Stage 1 – prescient: Introduce active recr devs in first stage when calculating OFL**
- **No Devs – equilibrium forecast**
- **Recr Devs – recalculate with recr devs after setting future quotas using equilibrium**
- **Recr Devs & 20% Implementation Error**

Forecasting Results at 75% of Fmsy