



ASSESSMENT OF THE PACIFIC SARDINE RESOURCE IN 2011 FOR U.S. MANAGEMENT IN 2012



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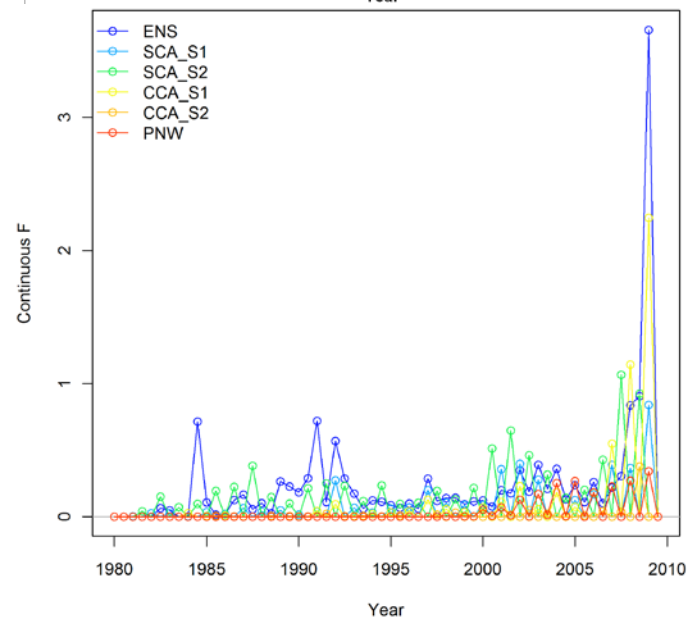
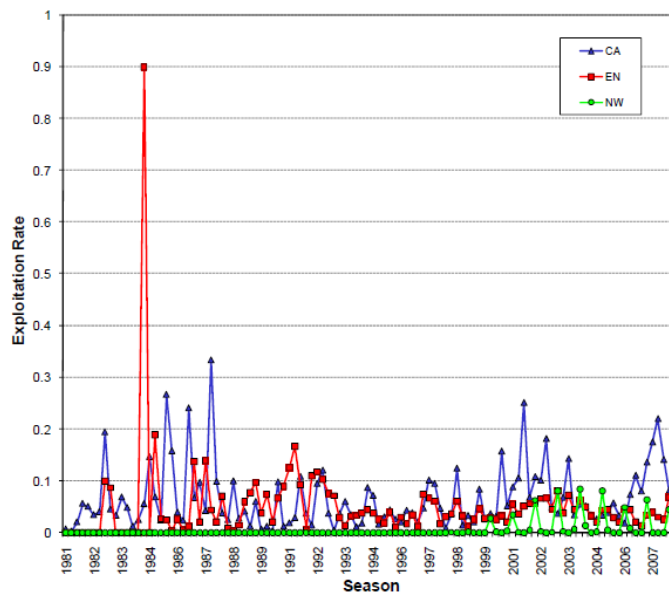
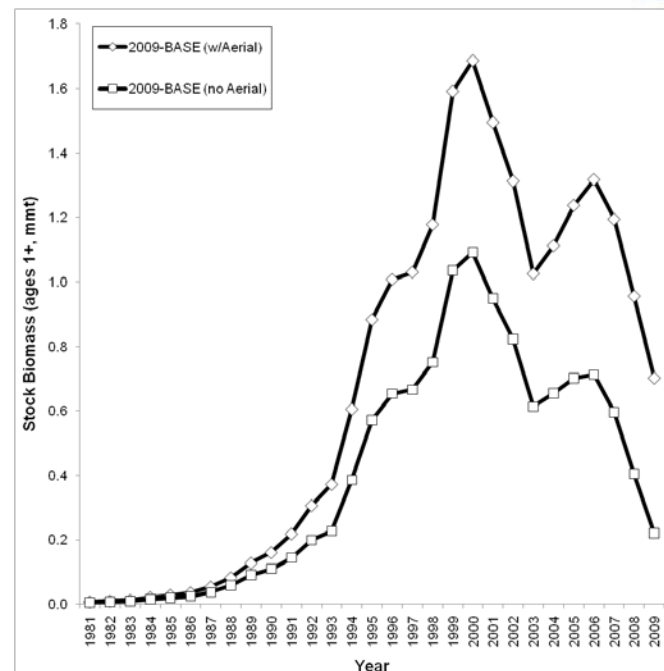
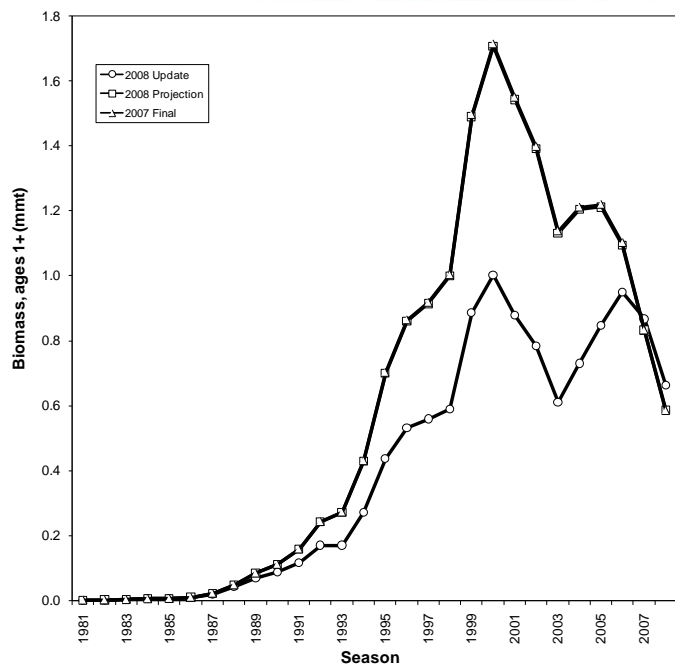
STAR Panel: Andre Punt, Ray Conser, Larry Jacobson, Chris Francis, Mike Okoniewski, and Lorna Wargo



Ongoing Sardine Modeling Issues

- Scaling population from low to high (CANSAR, ASAP) to lower levels again (SS);
- Sensitivity to new data (e.g. SS model 2008);
- Implausibly high F estimates (SS models 2009-2010):
 - fixed ' $q=1$ ' for Aerial Survey;
- Recent models had many selectivity parameters and time-varying elements resulting in some model instability (i.e. over-parameterized).

2008 Assessment Update // 2009 Full Assessment





Changes from Previous Assessments

NEW MODEL STRUCTURE:

Goal: build more parsimonious model; robust to data/scaling; plausible F estimates;

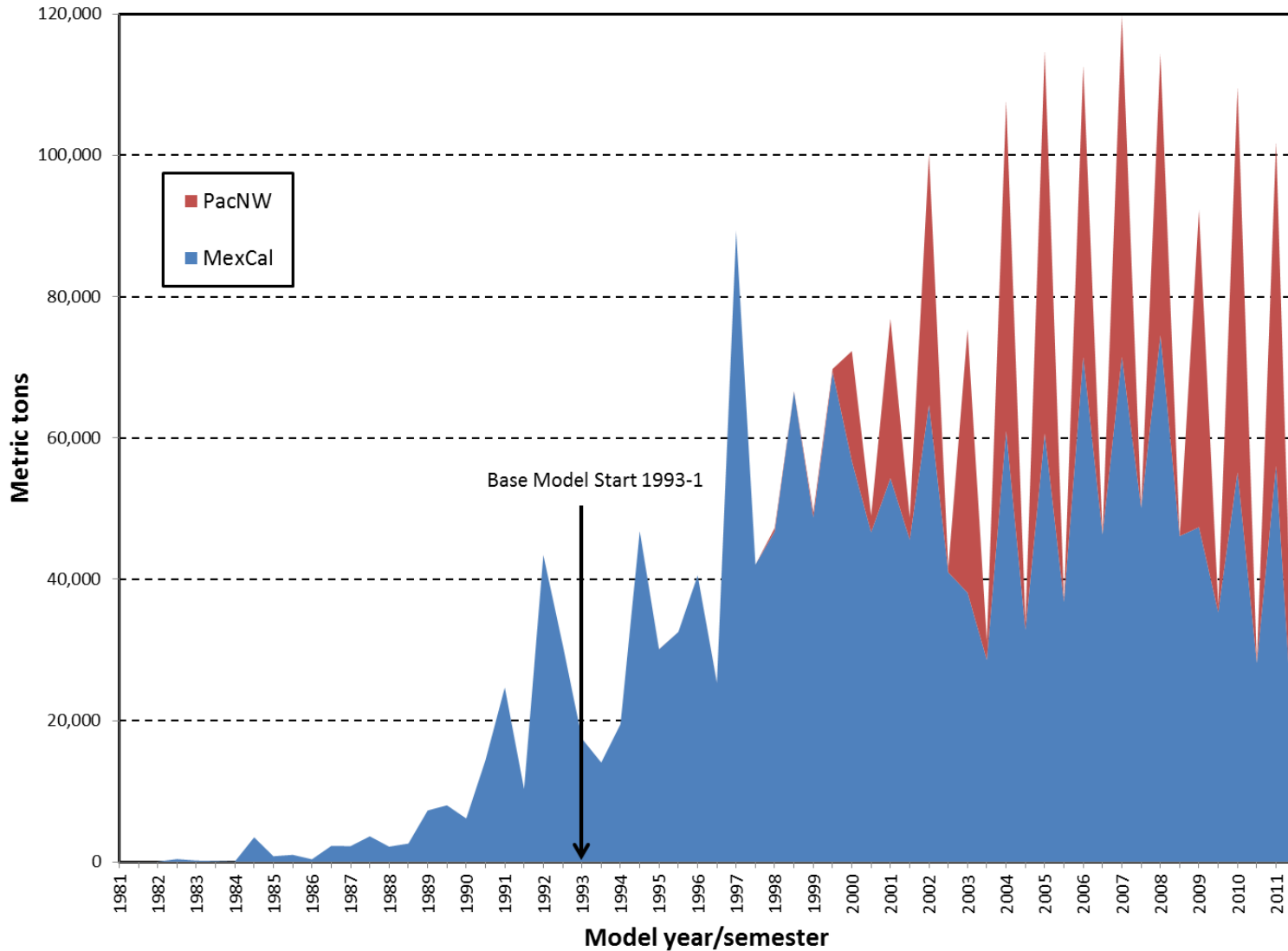
- Regional fisheries aggregated to MexCal and PacNW 'fleets';
- Truncated time series (1993 start year);
- Fewer time-varying elements (selectivity and growth);
- Number of estimated parameters reduced from 132 to 61

NEW DATA SOURCES:

- SWFSC Acoustic survey time series
- Ensenada fishery lengths, 1989-2009

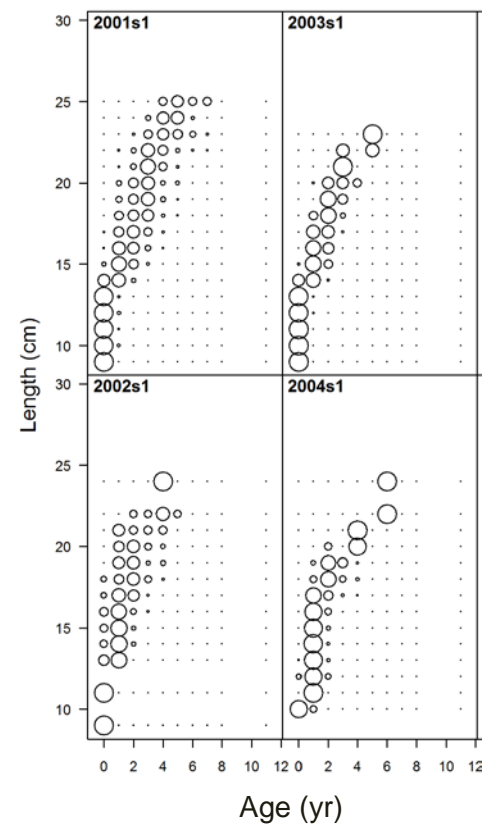
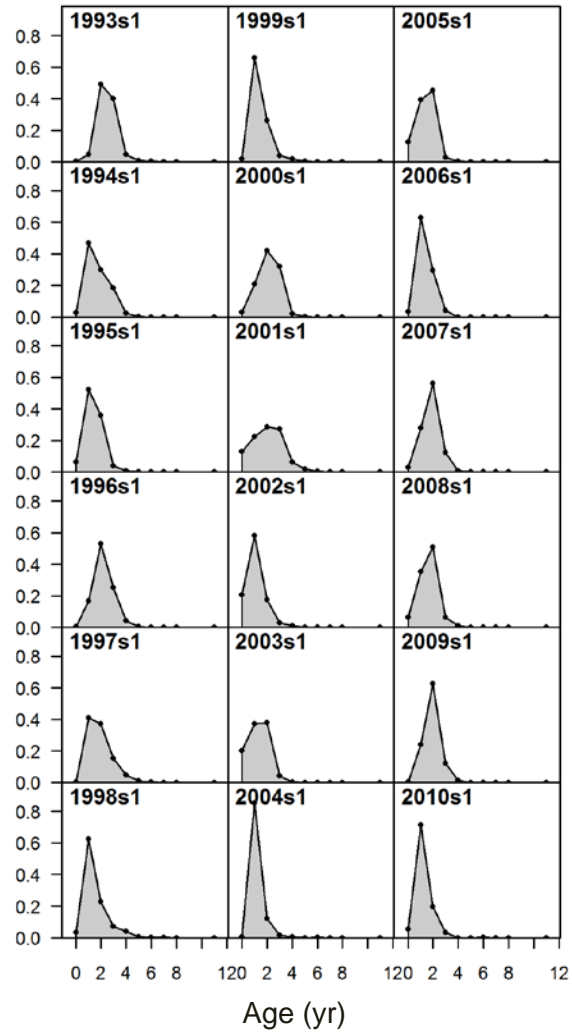
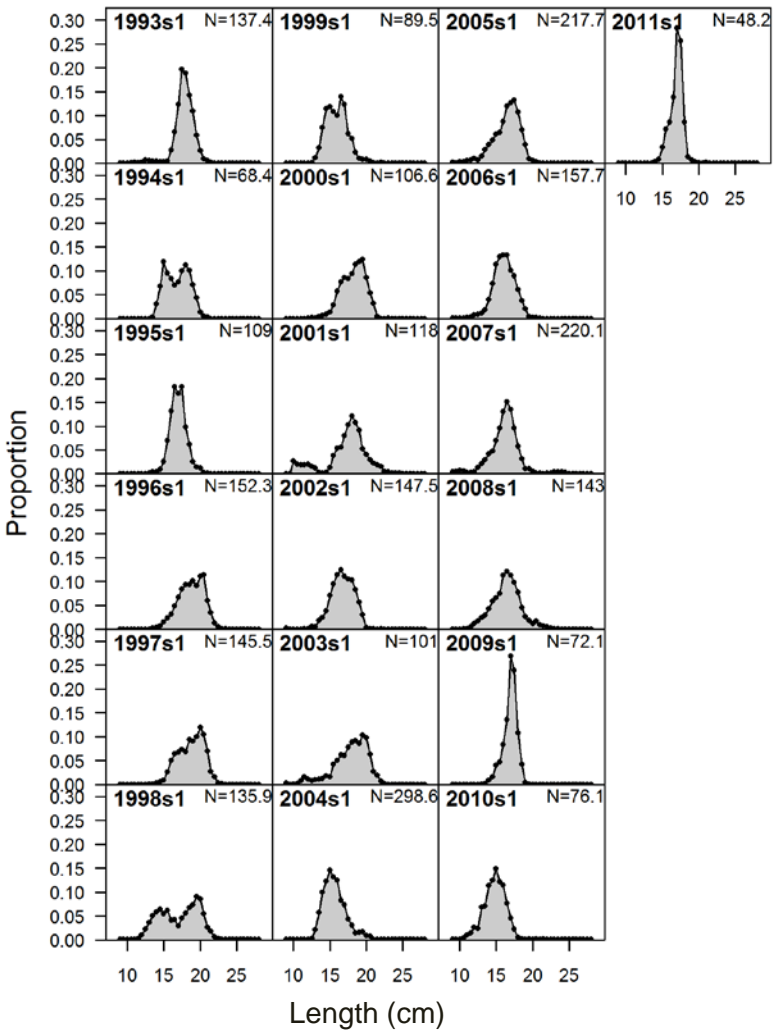


Landings by Fleet and Season



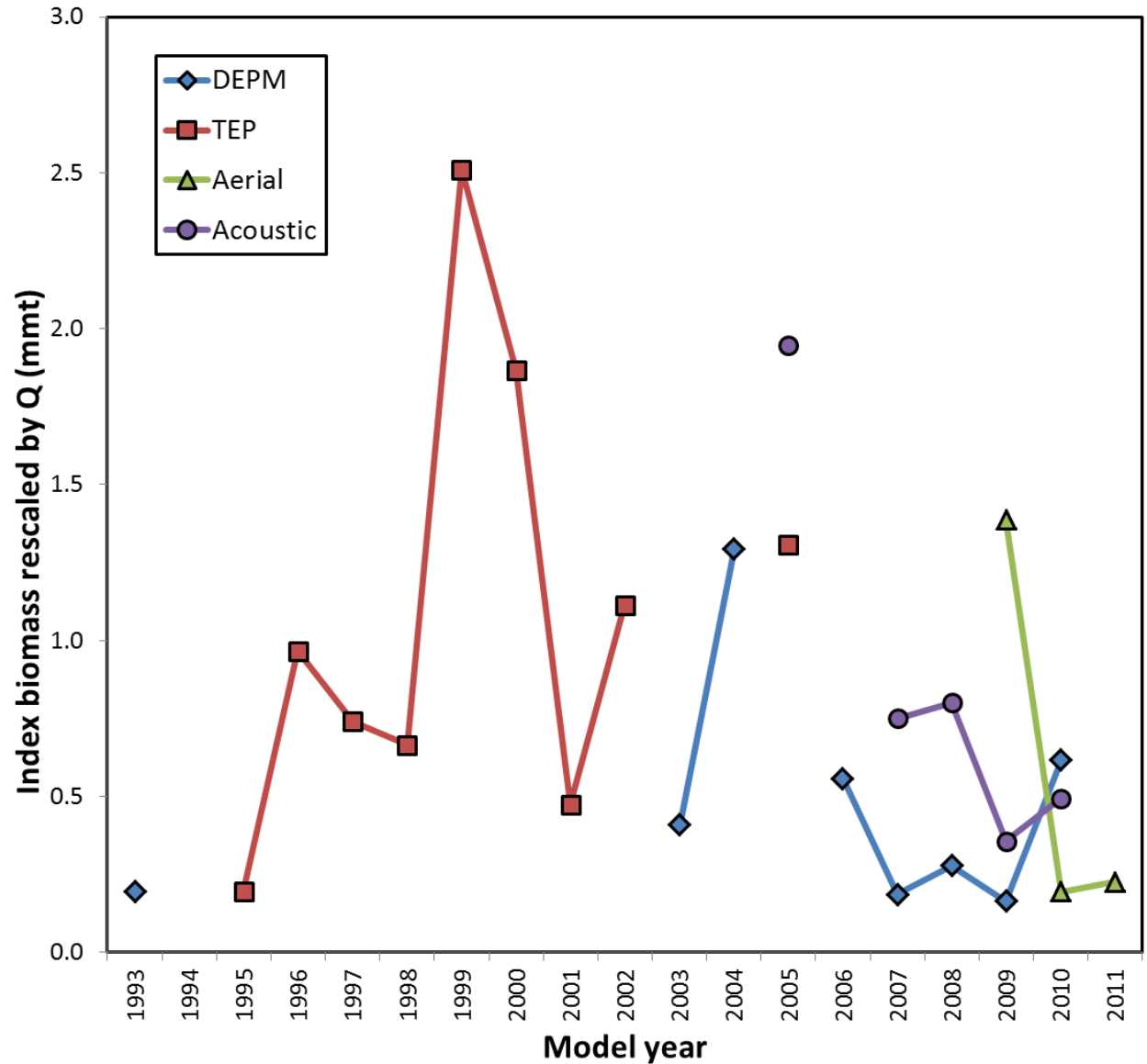


Length & Age Composition – MexCal_S1 Fleet



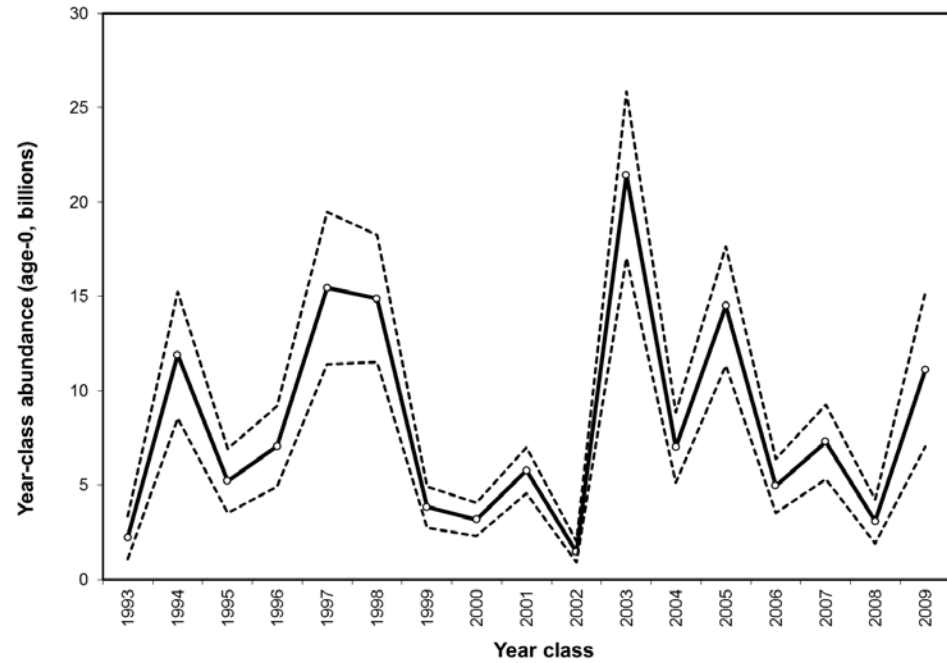
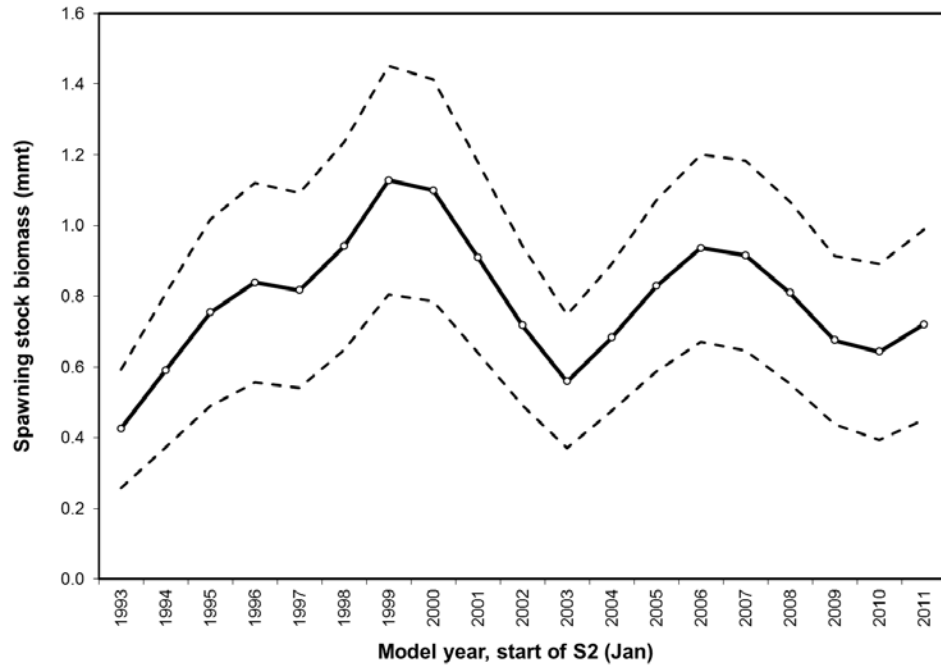


Survey Indices of Biomass



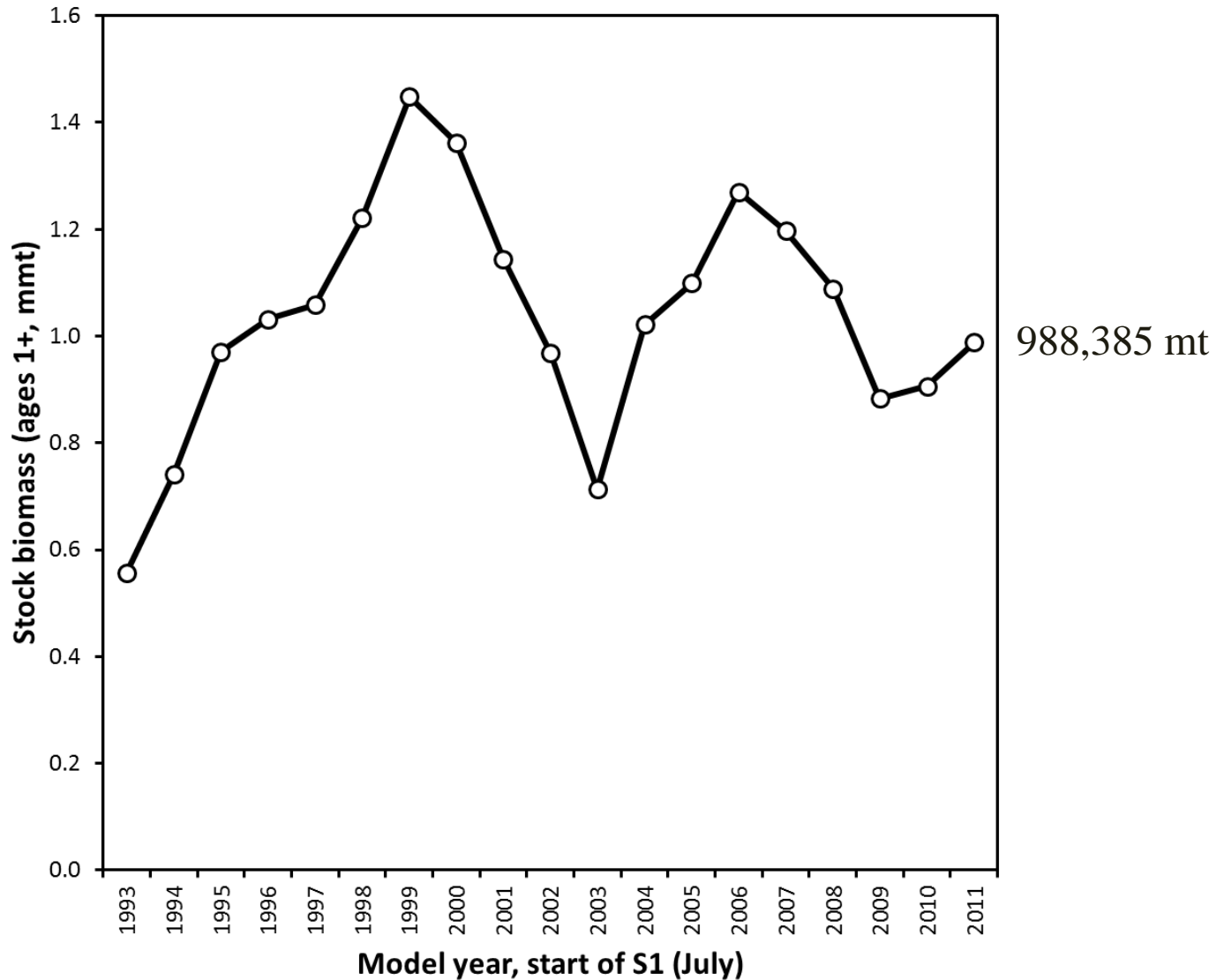


SSB and Recruitment Estimates



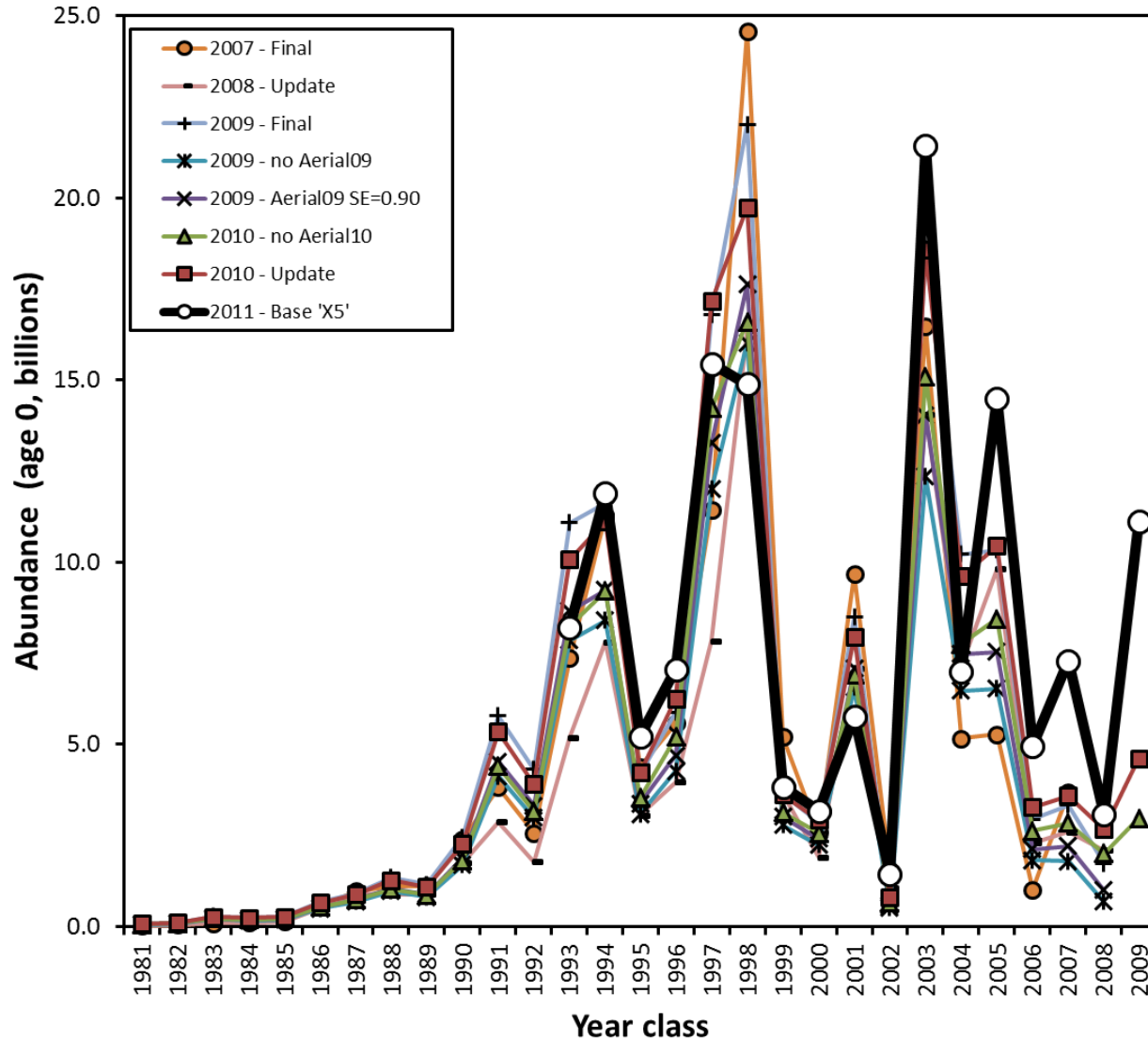


Estimated Stock Biomass Series from Base Model





Estimated Recruitment Series from Base Model





OFL, ABC, and HG for 2012

Harvest Formula Parameters	Value			
BIOMASS (ages 1+, mt)	988,385			
Pstar (probability of overfishing)	0.45	0.40	0.30	0.20
BUFFER _{Pstar} (Sigma=0.36)	0.95577	0.91283	0.82797	0.73861
F_{MSY} (stochastic, SST-independent)	0.18			
FRACTION	0.15			
CUTOFF (mt)	150,000			
DISTRIBUTION (U.S.)	0.87			
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Amendment 13 Harvest Formulas	MT			
OFL = BIOMASS * F_{MSY} * DISTRIBUTION	154,781			
ABC _{0.45} = BIOMASS * BUFFER _{0.45} * F_{MSY} * DISTRIBUTION	147,935			
ABC _{0.40} = BIOMASS * BUFFER _{0.40} * F_{MSY} * DISTRIBUTION	141,289			
ABC _{0.30} = BIOMASS * BUFFER _{0.30} * F_{MSY} * DISTRIBUTION	128,153			
ABC _{0.20} = BIOMASS * BUFFER _{0.20} * F_{MSY} * DISTRIBUTION	114,323			
HG = (BIOMASS - CUTOFF) * FRACTION * DISTRIBUTION	109,409			