



**NOAA**  
**FISHERIES**

# Gulf of Mexico King Mackerel Stock Assessment Update

## SEDAR 38 UPDATE

Presentation to

Gulf Council CMP

Advisory Panel



March 24, 2021

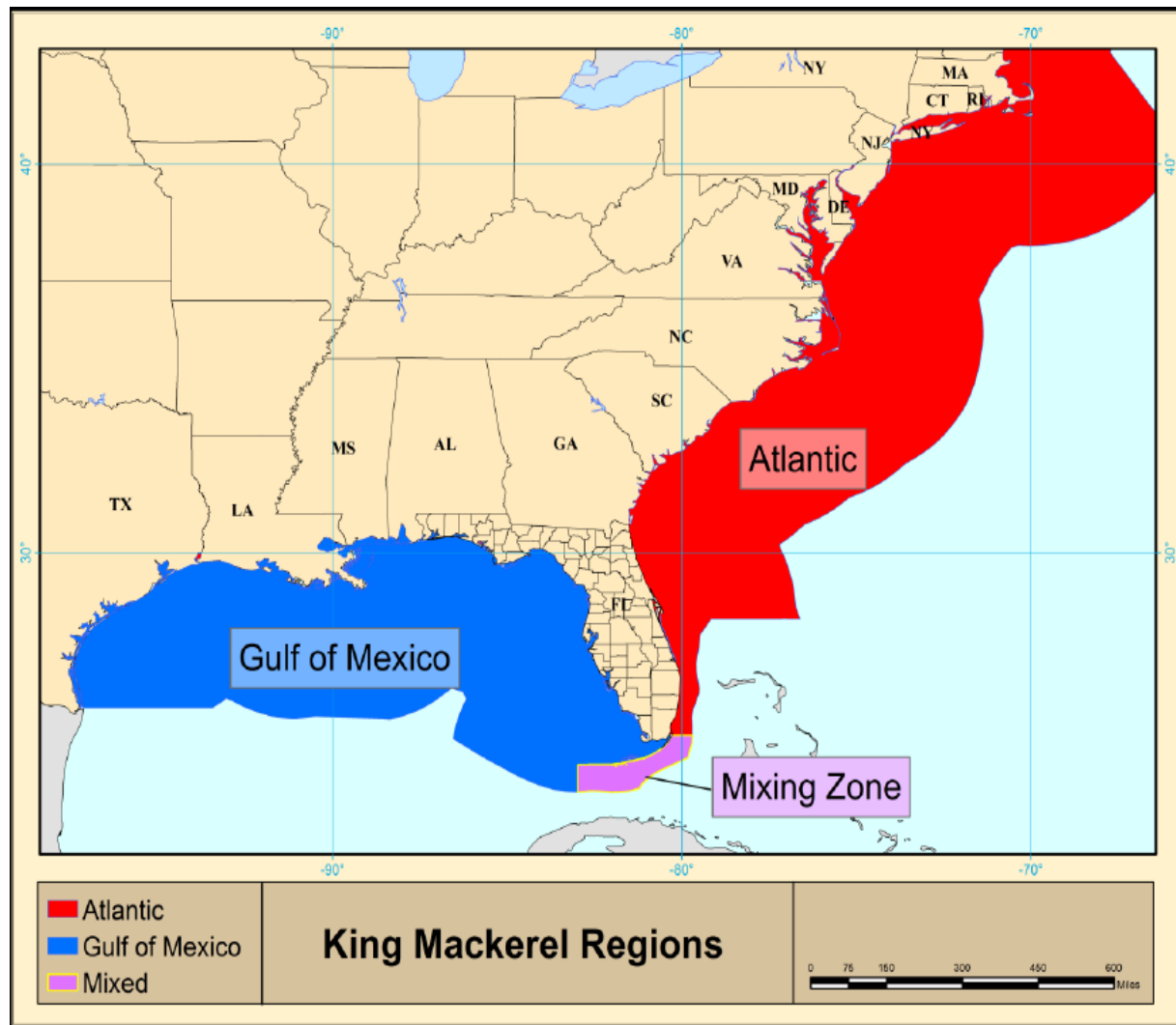
Originally by: SEFSC staff

Updated by: GMFMC staff

# Overview

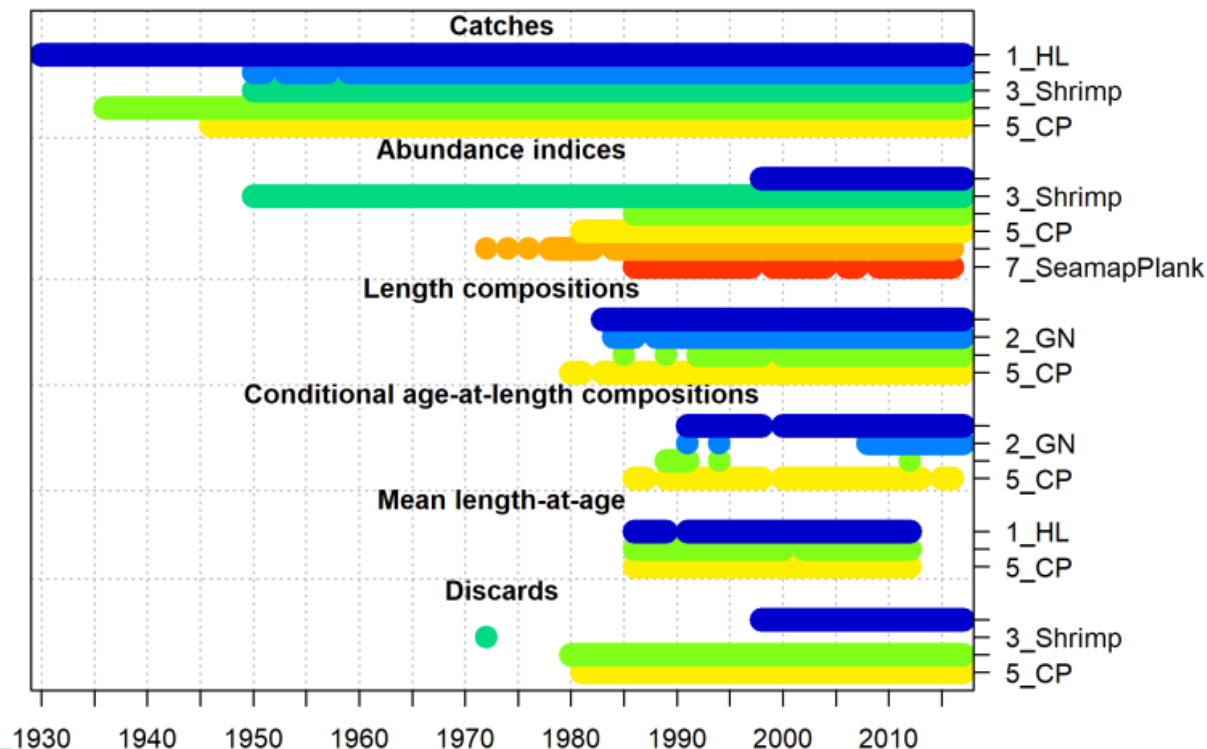
- SEDAR 38 model updated through 2017
- SEDAR 38 Update base model used same data sets where possible, with updated time series
- Key changes: using the Fishing Effort Survey (FES), and method of estimating shrimp fishery bycatch
- **S38U estimates Gulf king mackerel is not overfished and not undergoing overfishing.**
- **As of 2017, F was 83% of MFMT; SSB was 112% of MSST**
- **S38U projections show landings can remain at current values with a low probably of future overfishing or the stock becoming overfished.**

# SEDAR 38/Update Stock Boundaries

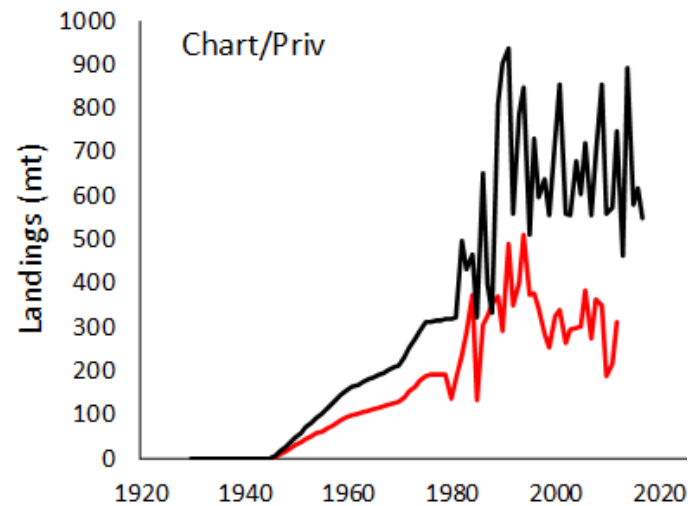
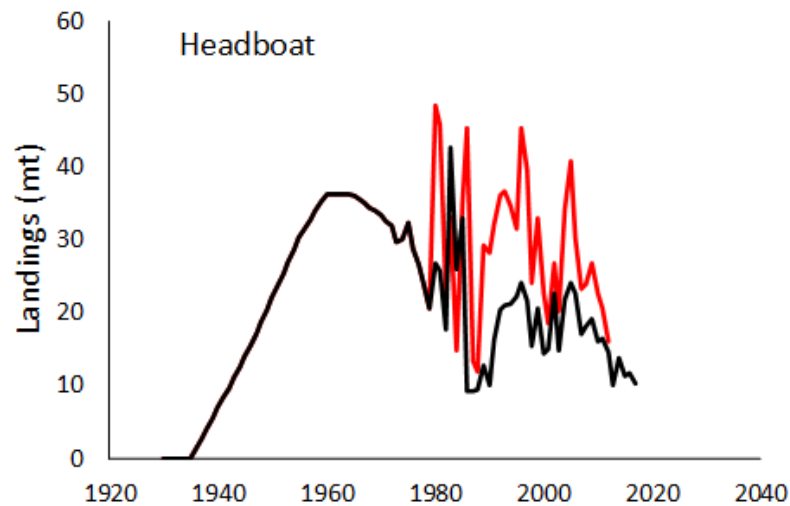
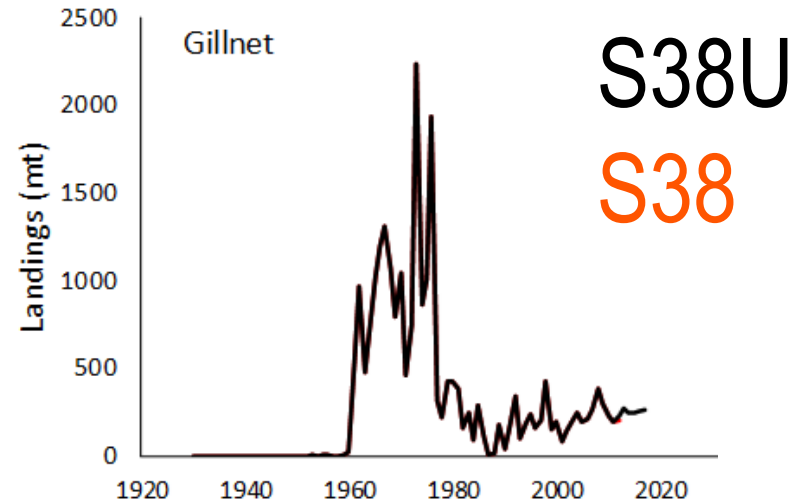
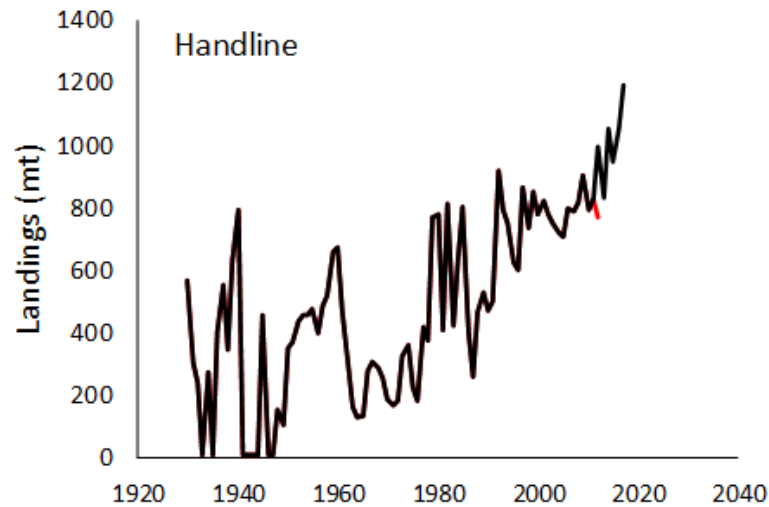


# Data - SEDAR 38 Update Model Configuration

- Data by Fishing Year (July 1 - 30-June 30)
- Gender-specific growth (von Bertalanffy)
- Start year = 1929 (unfished state), End year = 2017
- Fleets: Com HL, Com GN, Shrimp bycatch, Rec HB, Rec C/P
- Indices of abundance: Com HL logbooks, Rec SRHS, SEAMAP trawl juvenile survey
- $MSST = (1 - M) * SSBSPR30\%$  (where  $M = 0.174$ );  $MFMT = FSPR30$



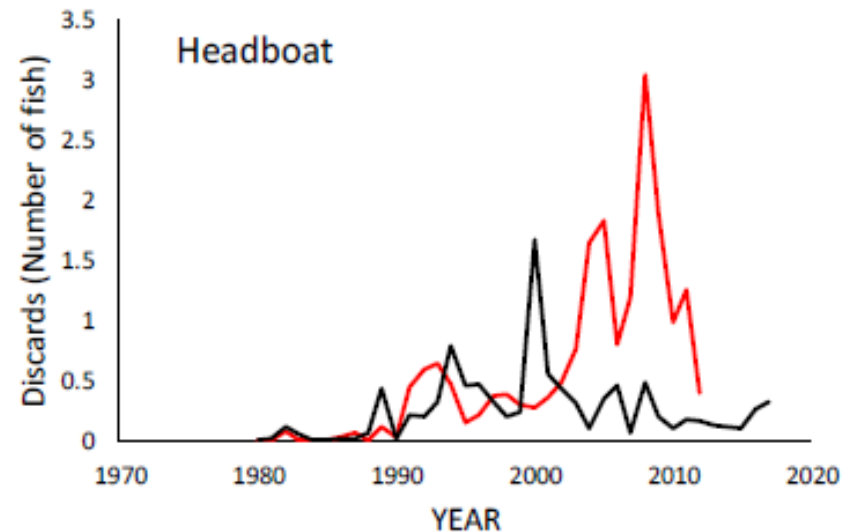
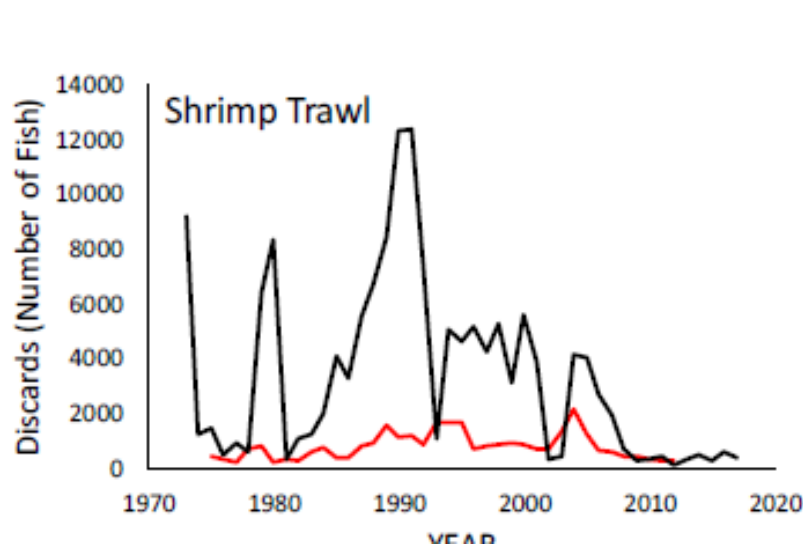
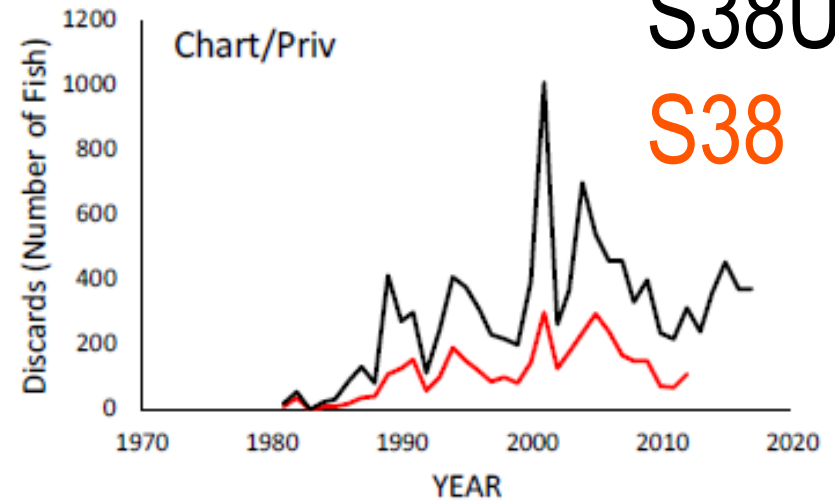
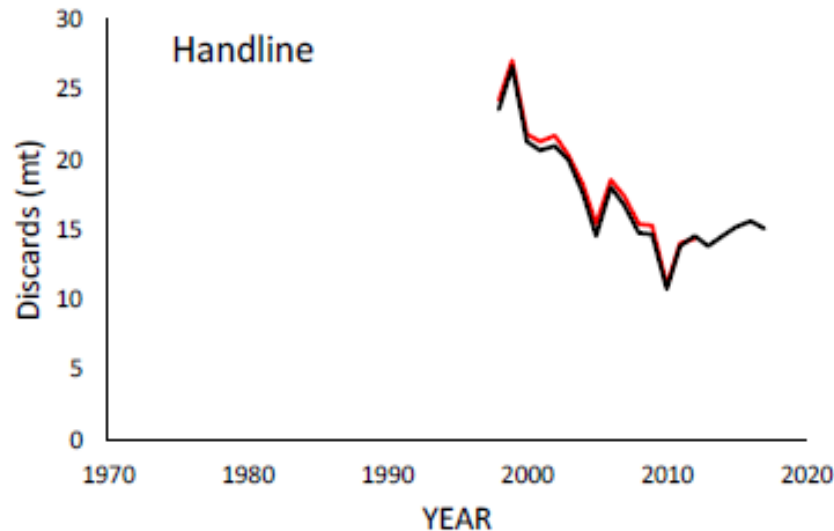
# Data - Updated Landings



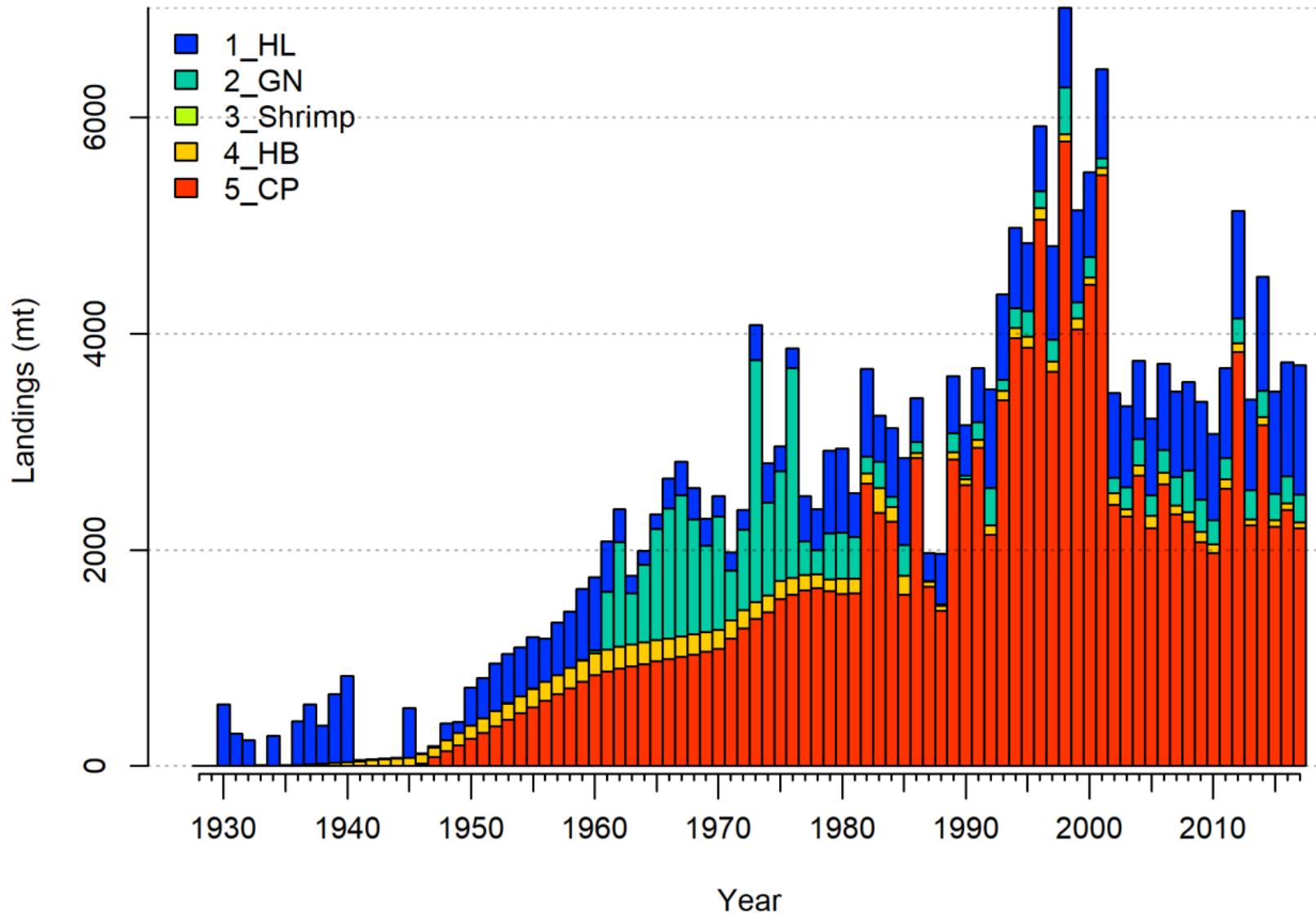
# Data - Updated Discards

S38U

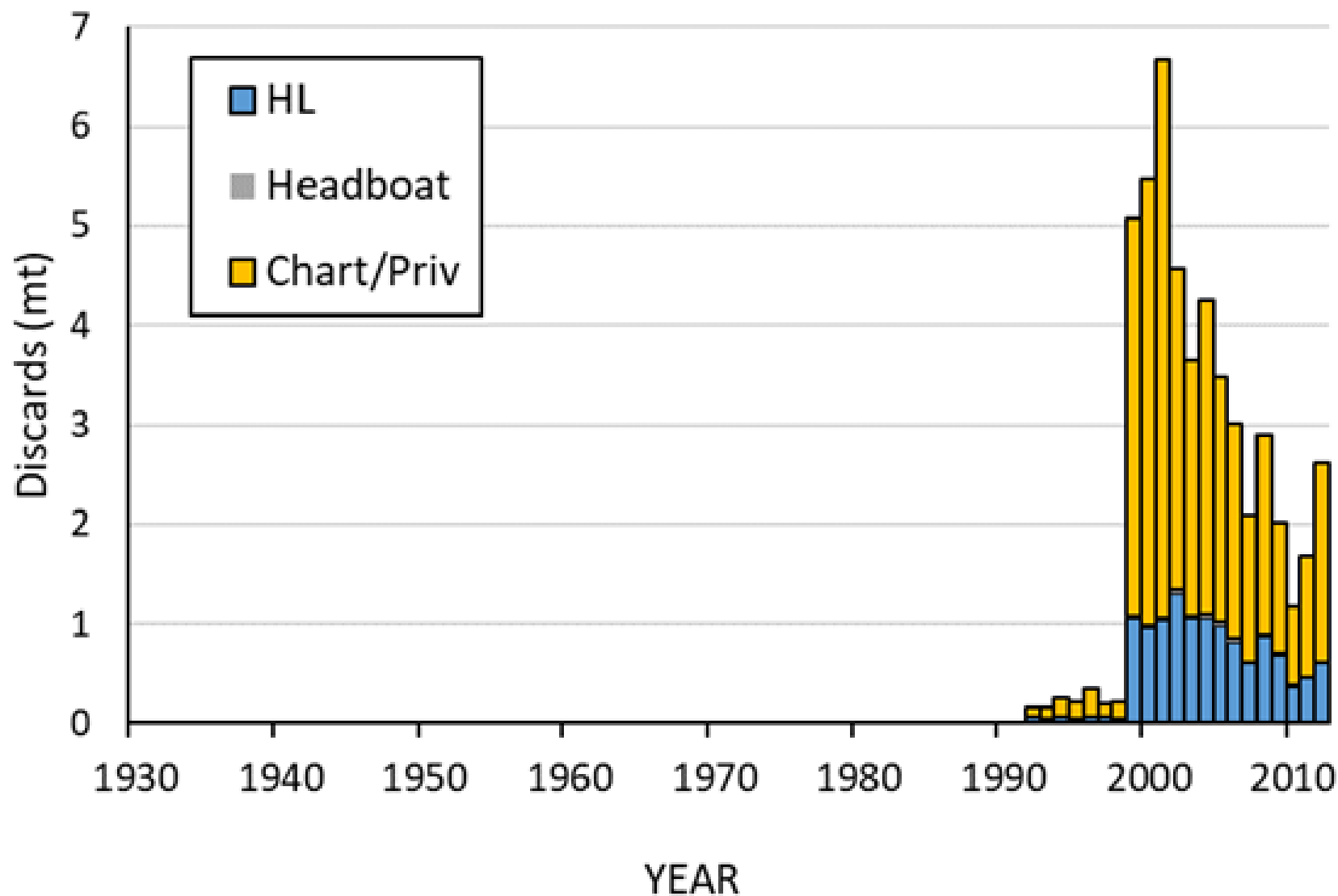
S38



# Data – Total Gulf of Mexico King Mackerel Landings



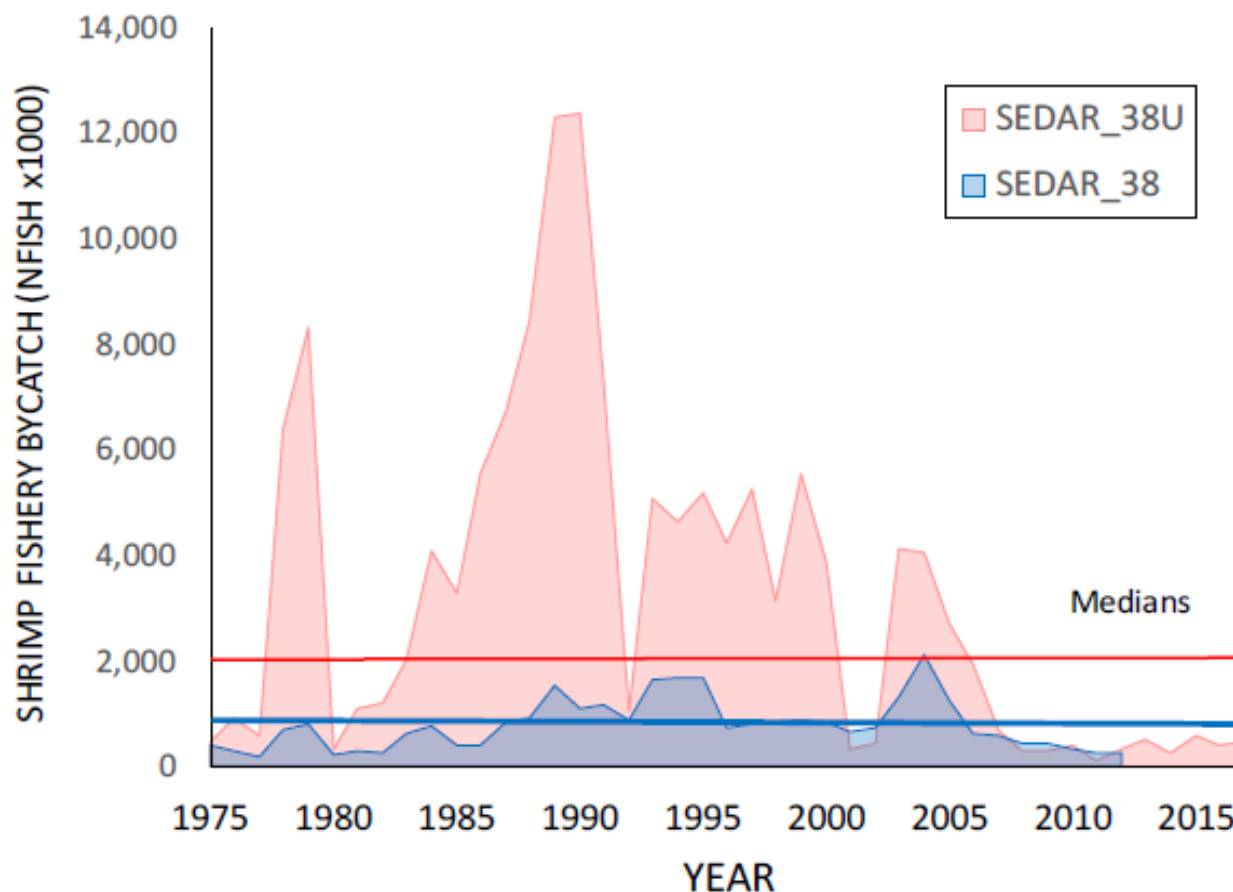
# Data - Total Discards



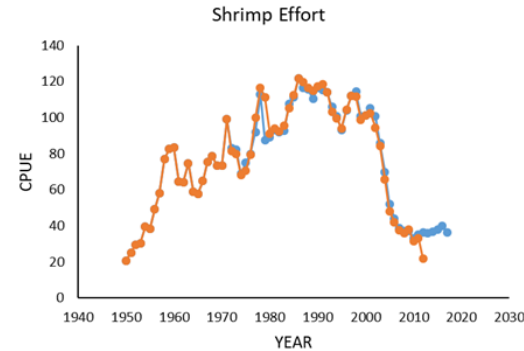
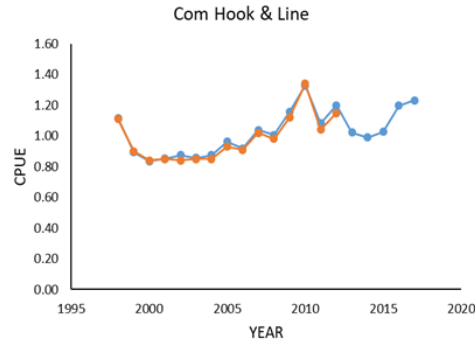


## Data - Compare Shrimp Fishery Bycatch

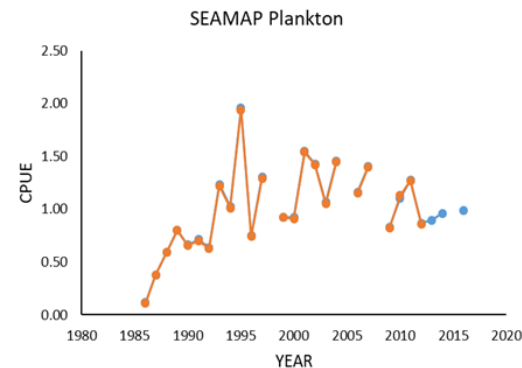
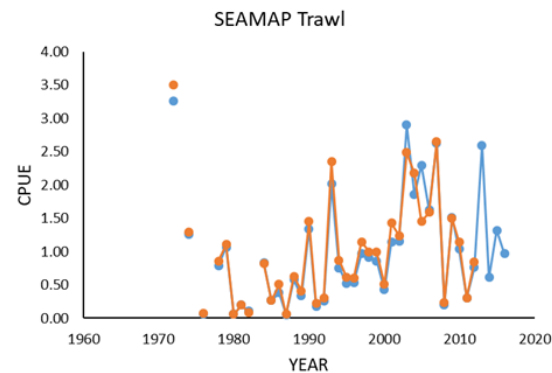
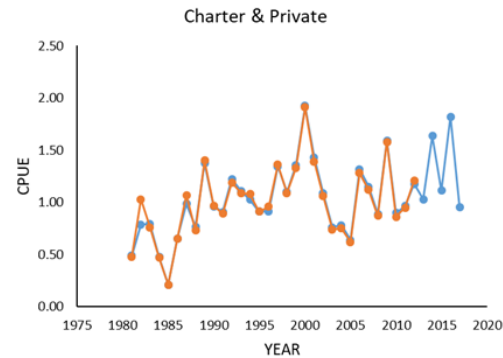
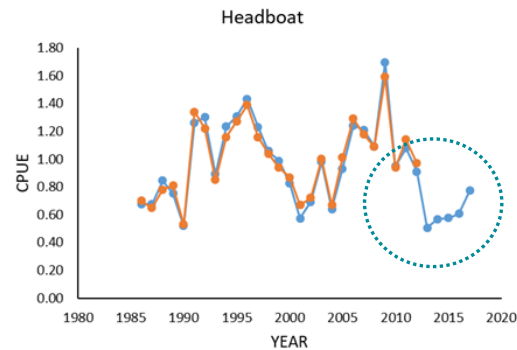
- Shrimp effort trend was essentially identical to SEDAR 38
- Method to estimate shrimp bycatch changed in S38U; increased median bycatch estimate from 708k fish to 1,998k fish



# Data - Updated Indices of Abundance and Shrimp Effort

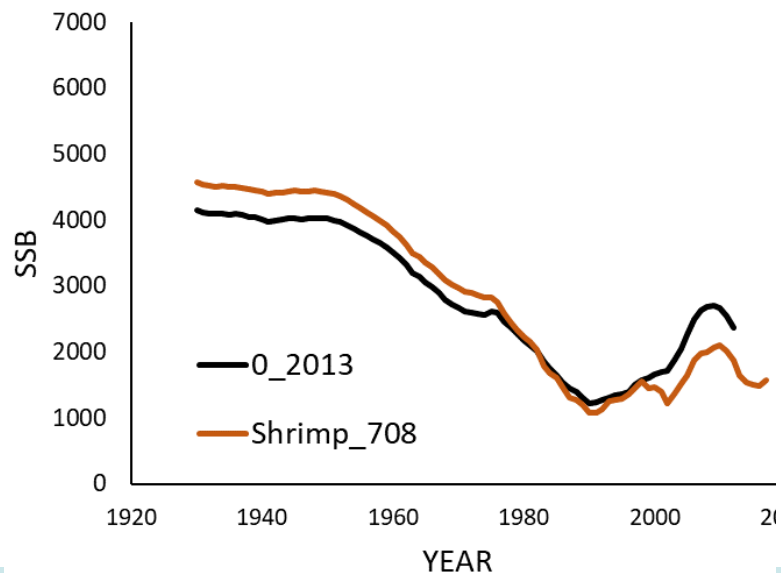
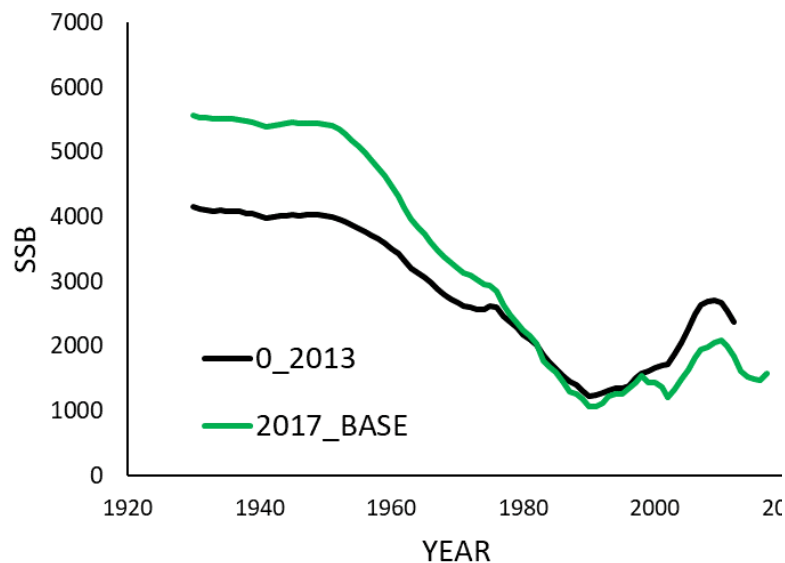


S38U  
S38



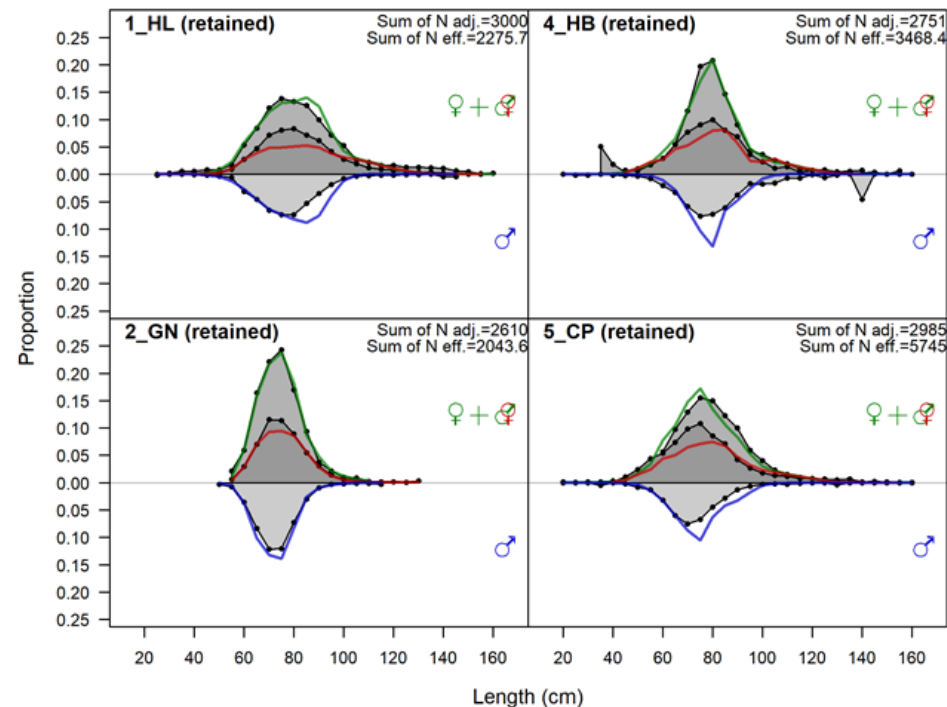
## Effects of updating All Data and fitting to up to 2017

- Adding and fitting to the 2017 data increased the estimate of virgin biomass ( $R_0$ )
- Estimates of biomass over the last 17 years has not increased as rapidly
- S38U shrimp bycatch trend is similar to S38
- Drop in estimated SSB over last 10 years due to more than just changes in shrimp bycatch

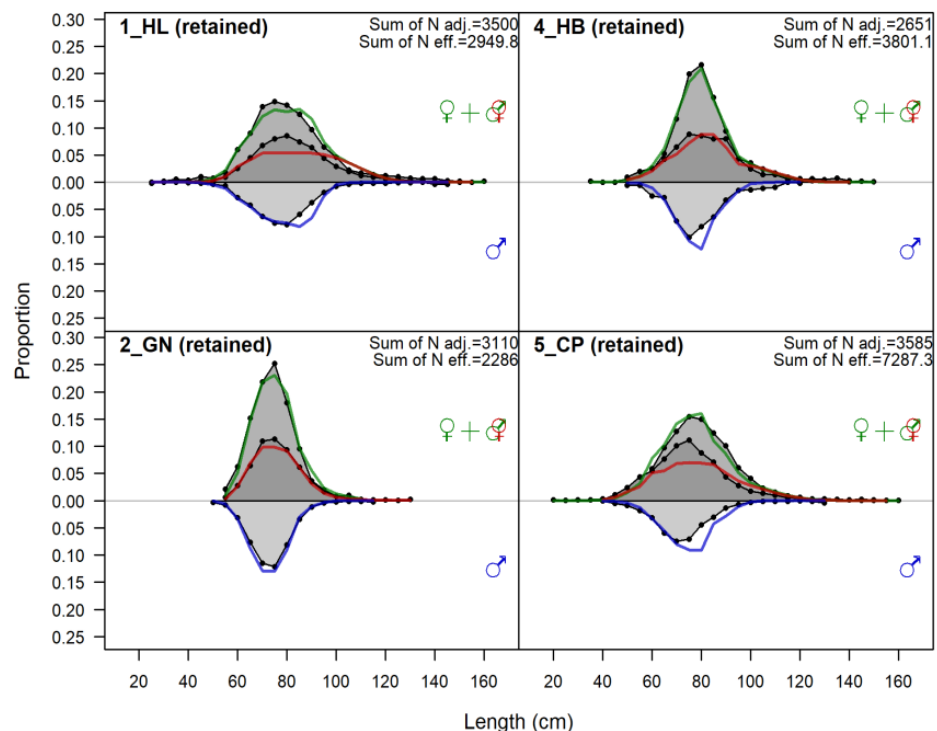


# Length comps/fits, aggregated across time by fleet

SEDAR 38

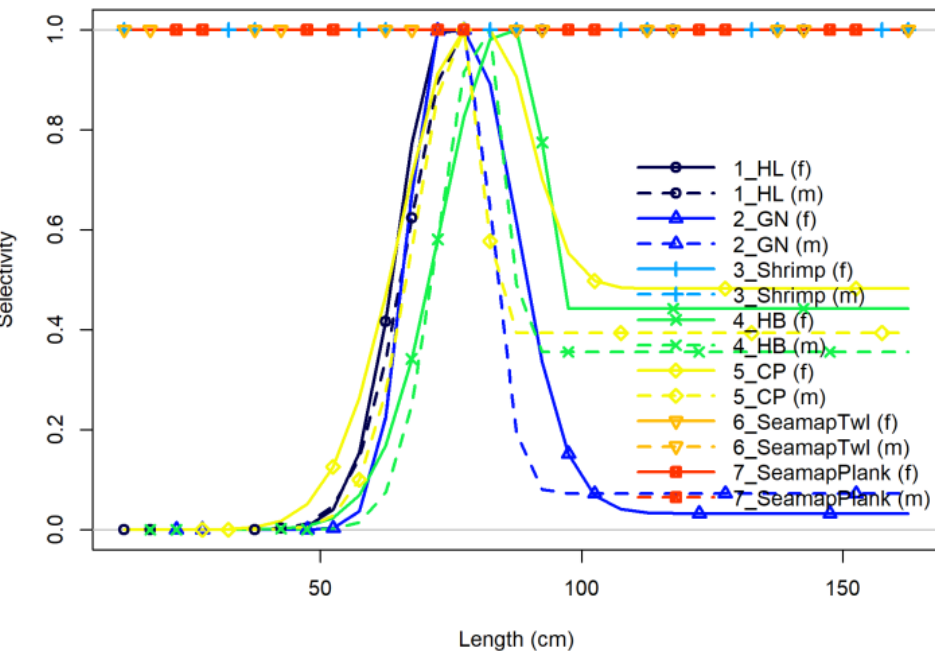


SEDAR 38U

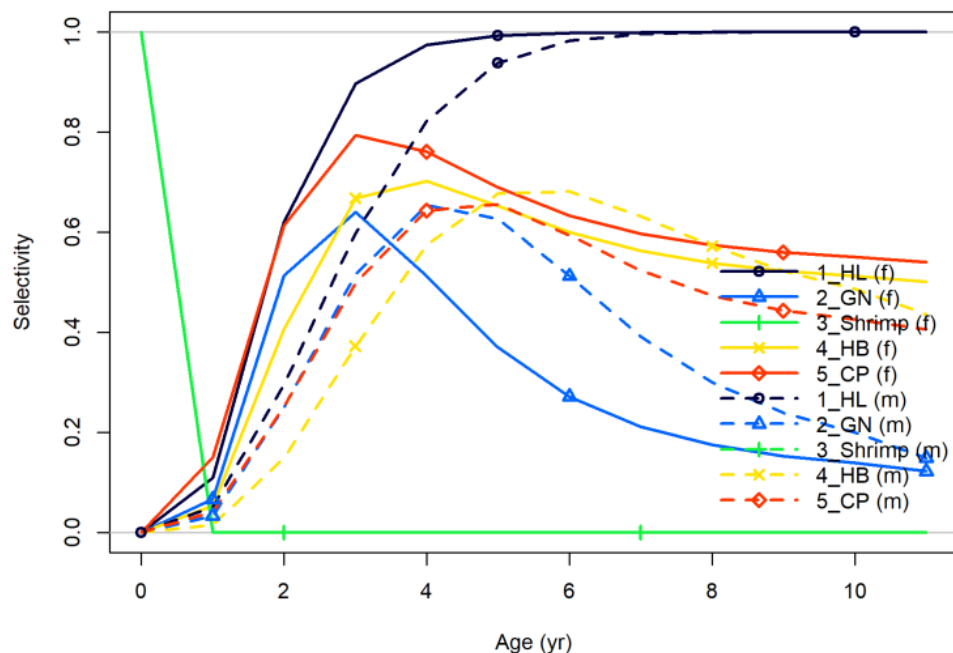


# Fleet Selectivities by Length (top left) and derived age (bottom right)

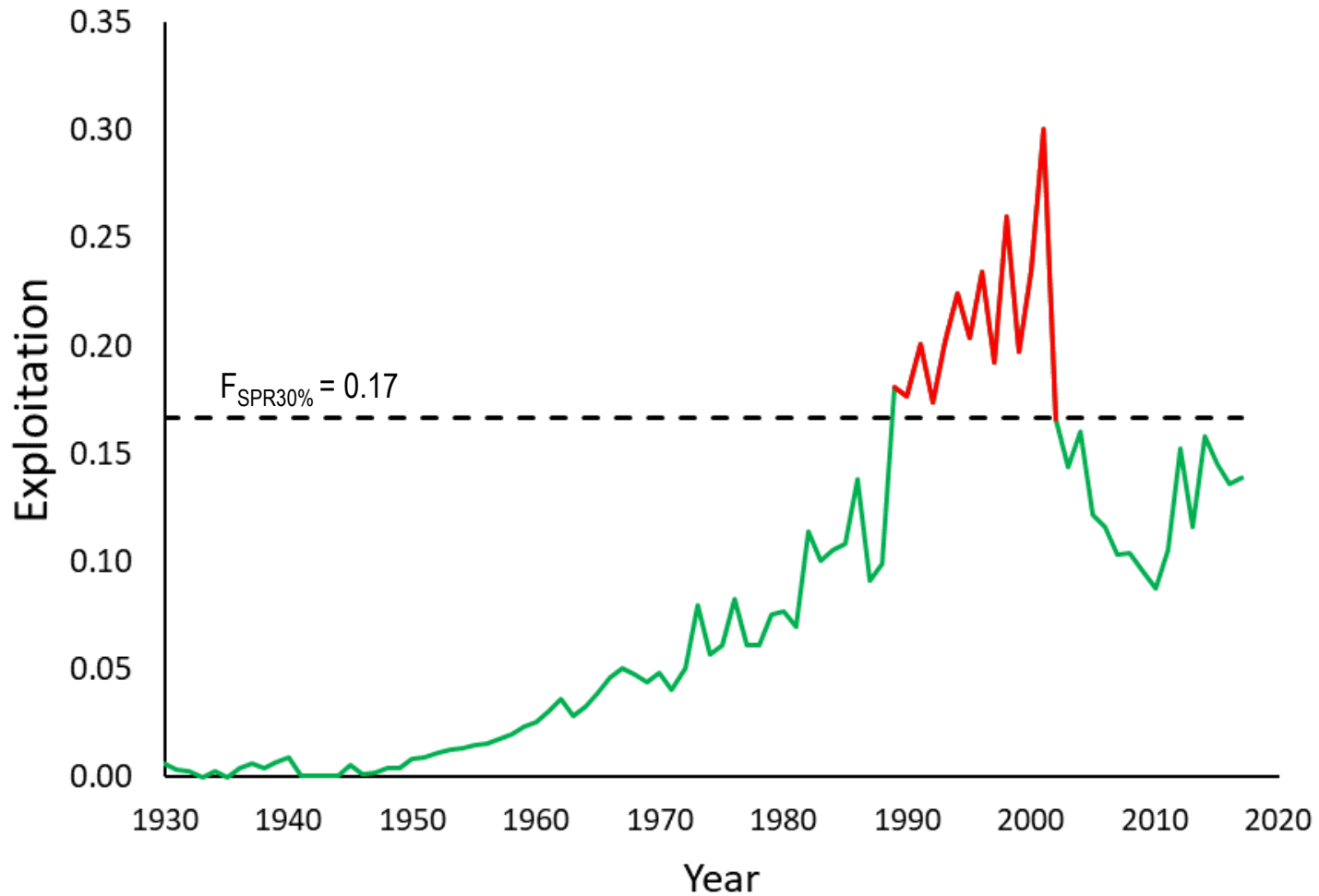
Length-based selectivity by fleet in 2017



Derived age-based from length-based selectivity by fleet in 2017

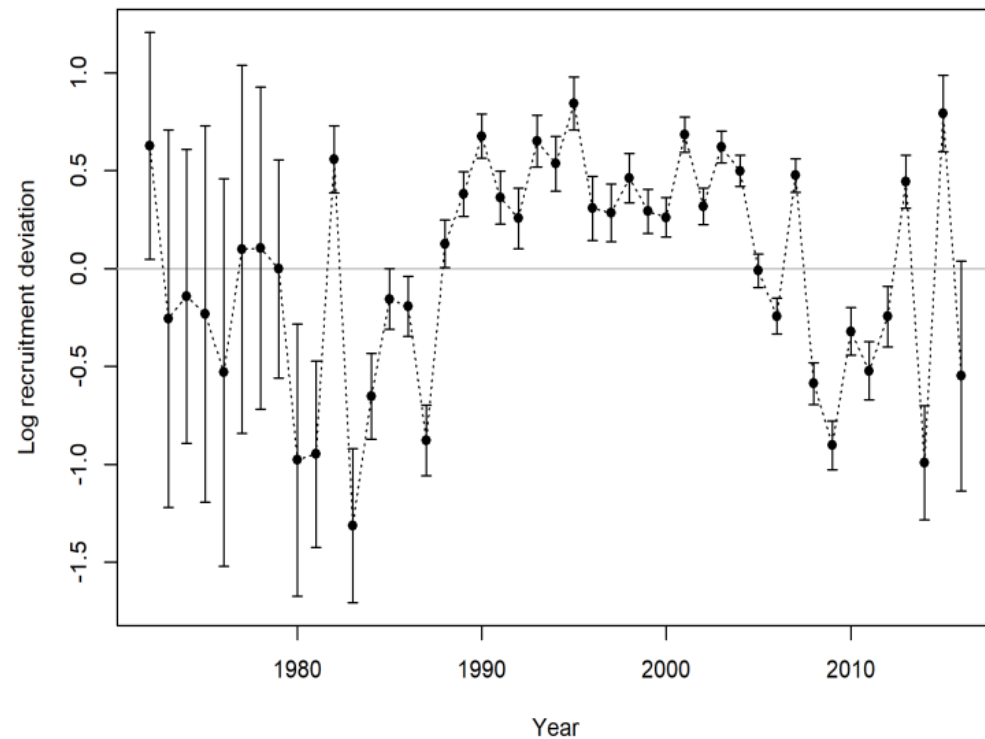
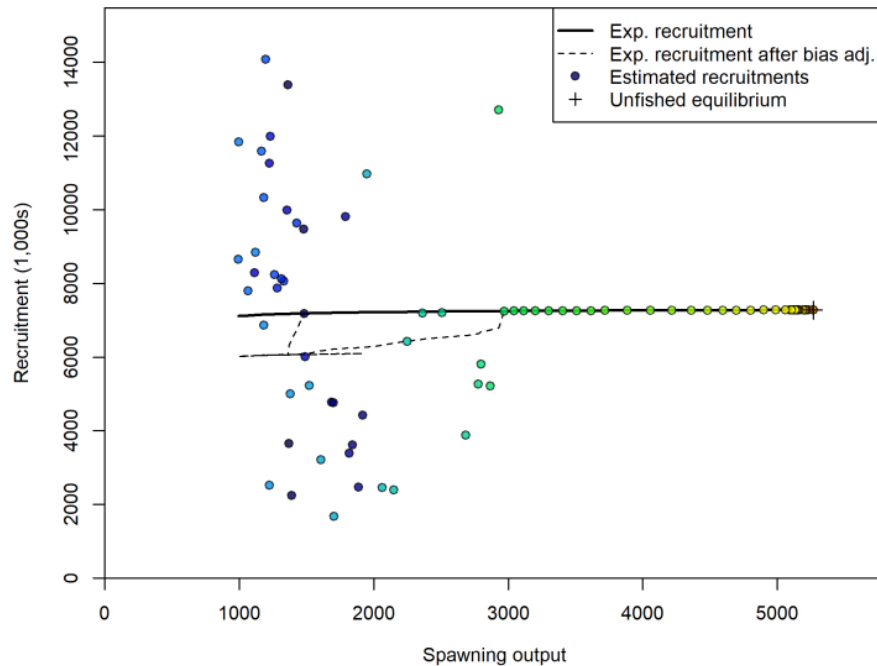


# Exploitation



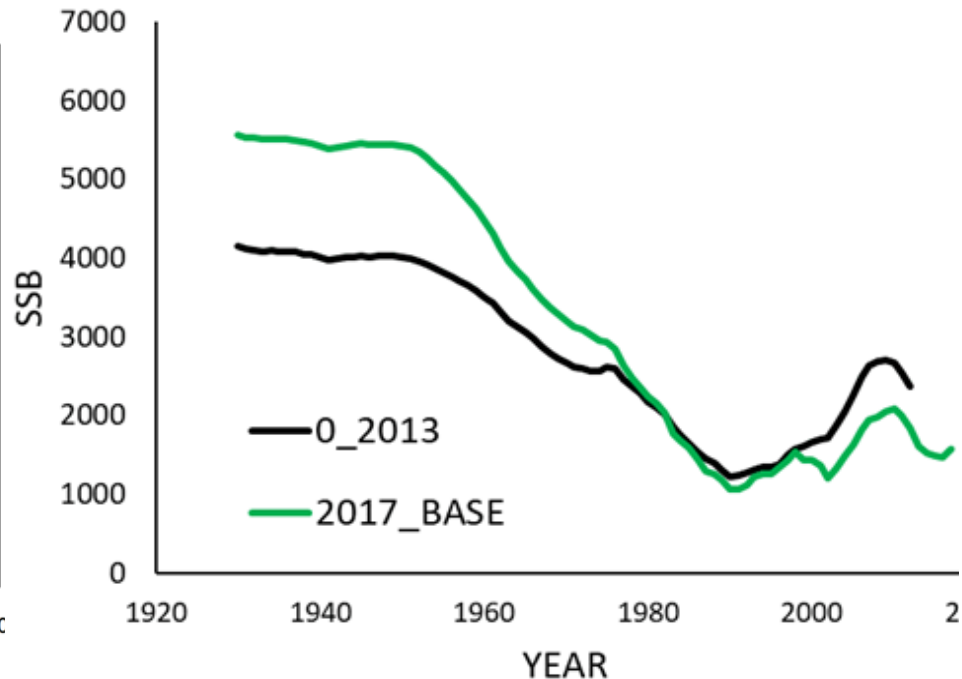
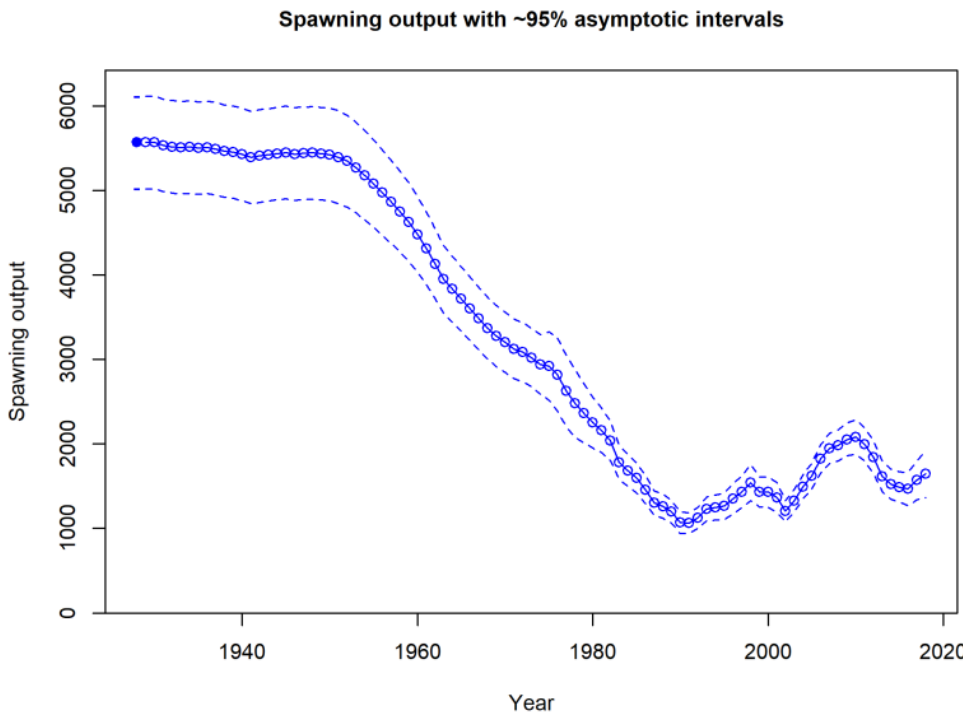
# Stock-Recruitment

- Stock-recruitment relationship poorly understood (top left)
- Recruitment cyclical, especially in last several years (bottom right)



# Stock Biomass

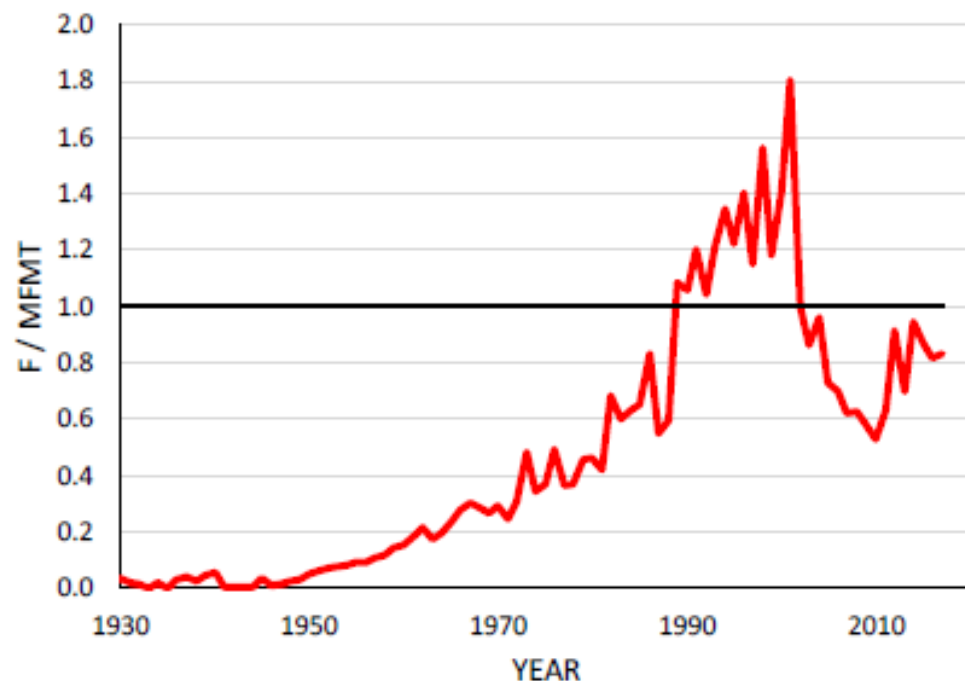
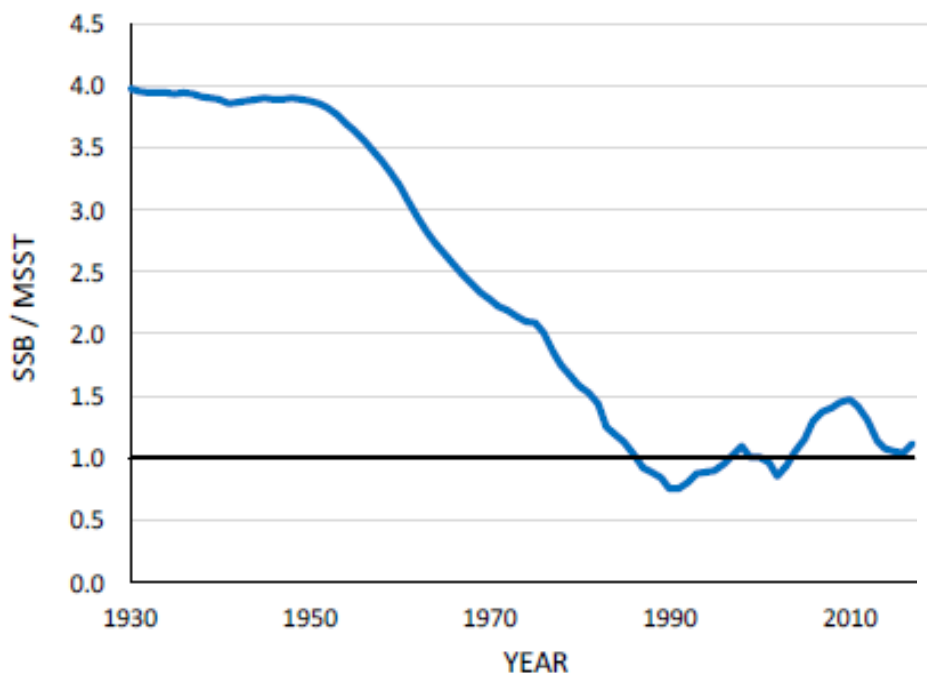
- SSB and total biomass generally increased since 1990
- The 95% CIs are unrealistically small due to fixed parameters
- Differences in biomass trends are due to update in shrimp bycatch and FES landings





# Stock Status: Not Overfished; Not Overfishing

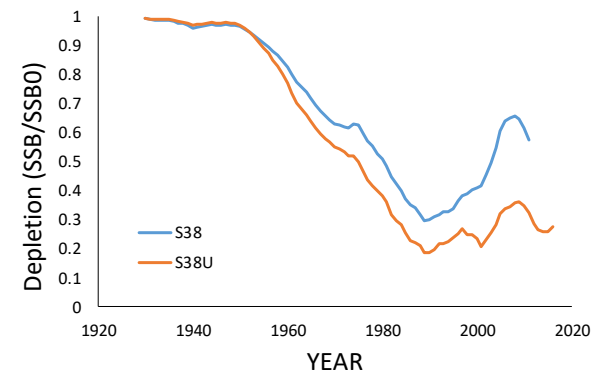
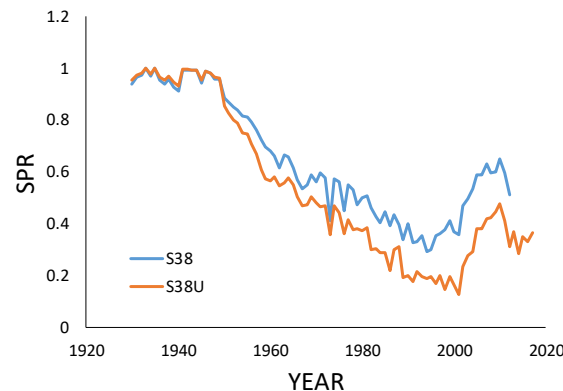
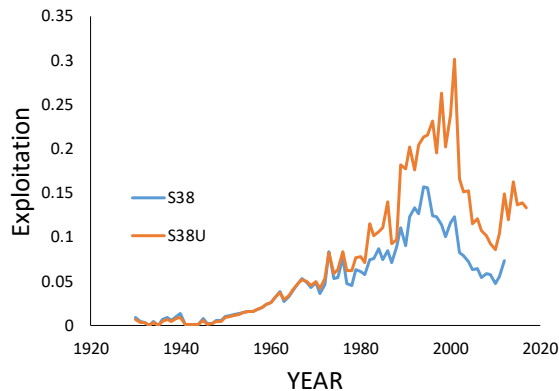
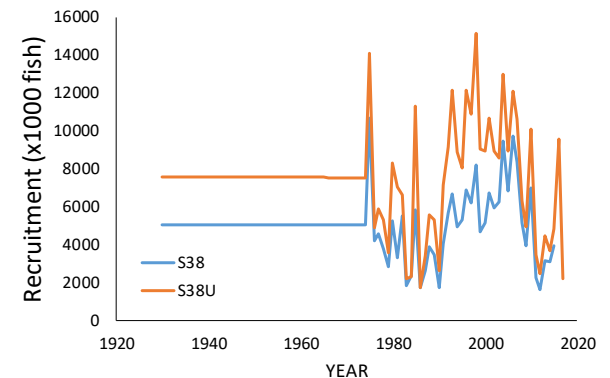
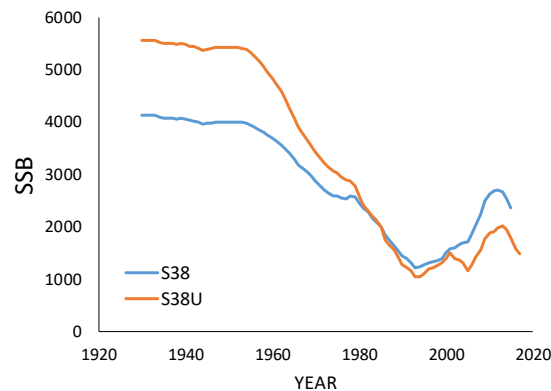
- $SSB_{2017} / MSST = 1.12$  (0.98 – 1.26) [top left]
- $F_{2017} / MFMT = 0.83$  (0.68 – 0.98) [bottom right]



# Population and Fishery Trends

## SEDAR 38 and 38 Update

- Larger virgin population size
- Larger recruitment
- Increased exploitation
- Decreased SPR
- More Depleted
- Increased OFL/ABC



# Projections: Settings

- Projections were made from 2021-2030
- Exploitation in 2018-2020 were assumed equal to those in 2017
- Retained catch for 2018-2020 determined using 2017 exploitation rate
- All future recruitments were equal to the maximum ( $R_0$ )
- The  $P^*$  value used in the original assessment ( $P^* = 0.43$ ) was applied to the projections of OFL to arrive at ABC

SSC uncomfortable with narrow buffers produced in projections. The SSC recommended OFL to be 10.89, 11.05, and 11.18 mp ww, and ABC to be 9.37, 9.72, and 9.99 mp ww for 2021-2023, respectively.

Annual ABC is the projected yield at FOY ( $0.85 * F_{SPR30\%}$ ).

# SEDAR 38U

## Summary

- Gulf king mackerel is currently not overfished or undergoing overfishing
- Maintaining yields at or below the 2021 OFL of 10.89 mp ww in the near-term will allow the stock to build towards the  $SSB_{MSYproxy}$
- While updates in catch data for 2018-2019 might increase the accuracy of projections somewhat, without updating the indices of abundance, these updated projections would be of only limited value