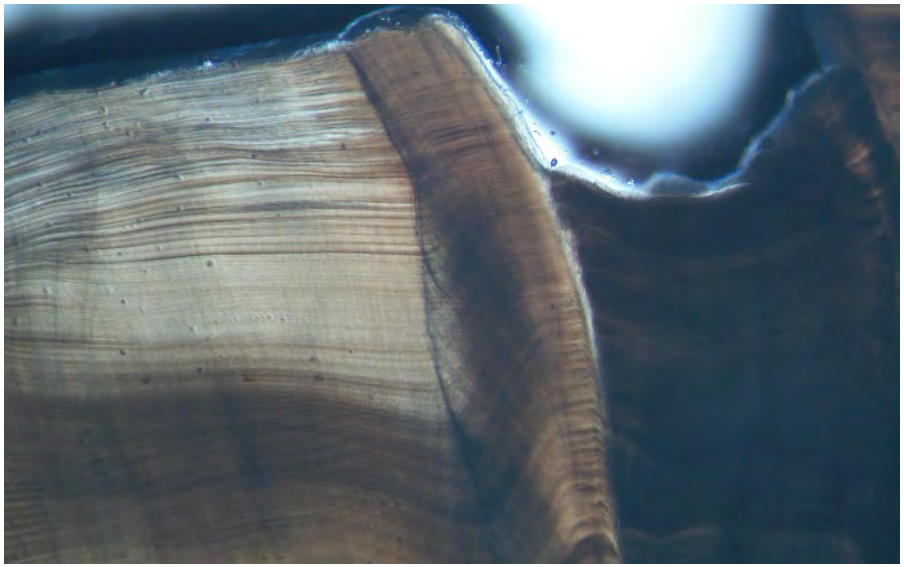
SEDAR36-Snowy Grouper Update

Scaling Age-dependent natural mortality using a maximum age point estimate

NOAA FISHERIES



SAFMC SSC Meeting
19 August 2020

Background

- The maximum observed age for SEDAR 4 and SEDAR 36 was 35
- SEDAR 36 used an age-based natural mortality point estimate to scale the Charnov age-dependent natural mortality over the fully exploited ages (4-35)
  - Hewitt and Hoenig (2005) M=0.12
- Cumulative survival to max age= 1.5%
- Snowy grouper are difficult to age, older fish more problematic
- Assessment model fits age comps to 14
- Population modelled to age 25+
- Fish from South Florida can be more difficult to age in general

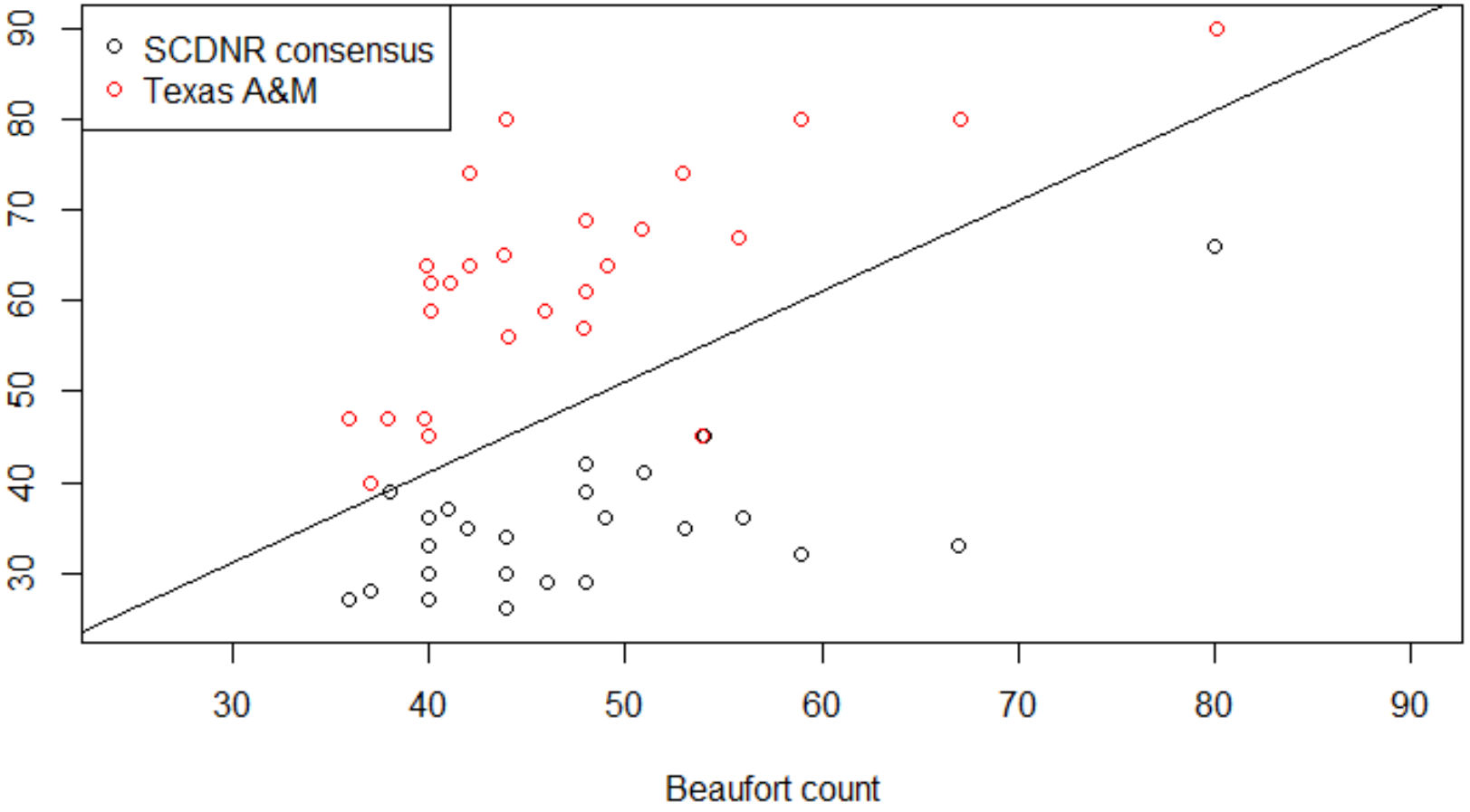
New Information

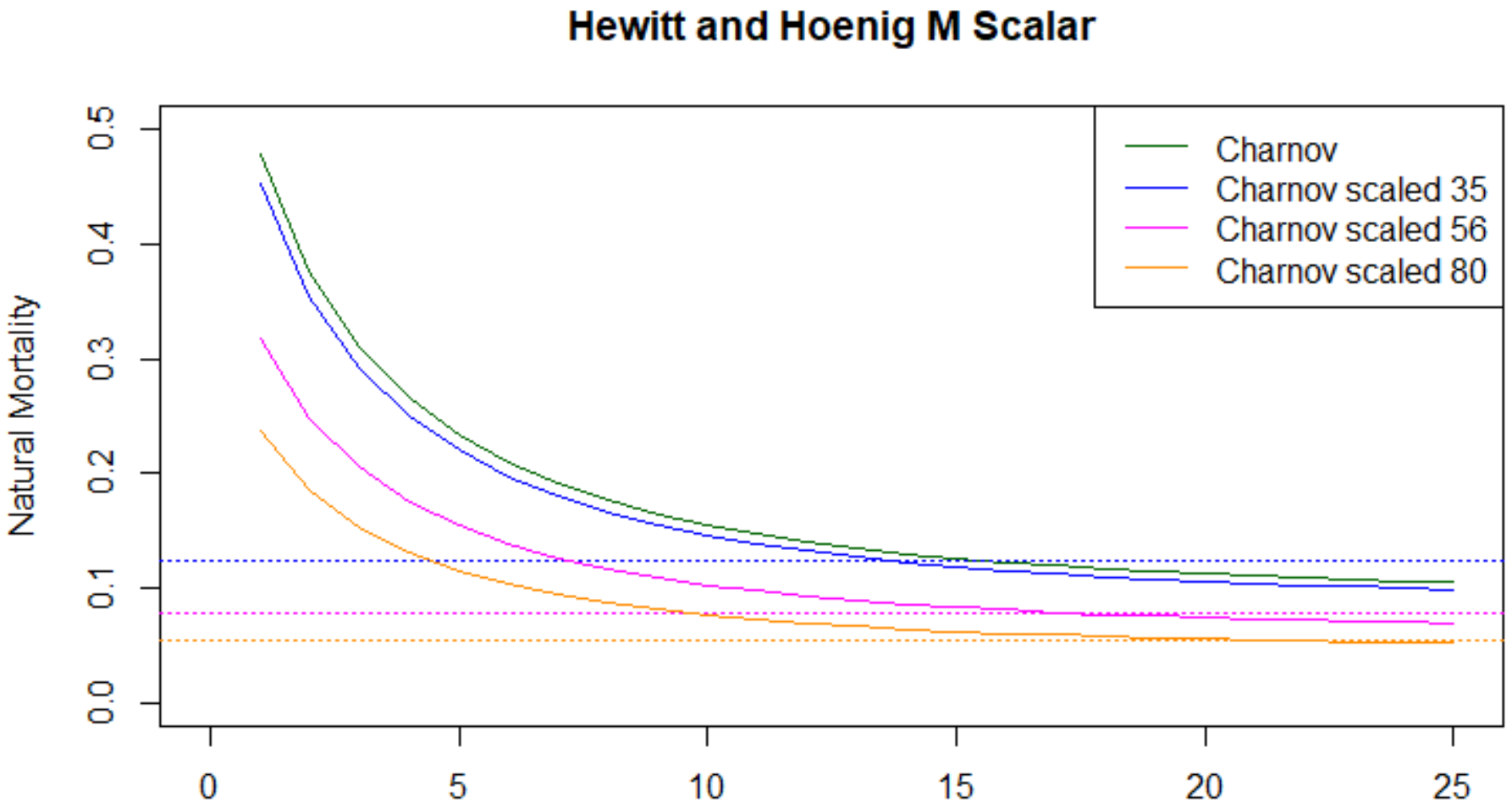
- Studies evaluating snowy grouper longevity
  - Costa et al. (2011), max age of 54, Brazil
  - Sanchez et al. (2019), bomb radiocarbon age of 56, GoM

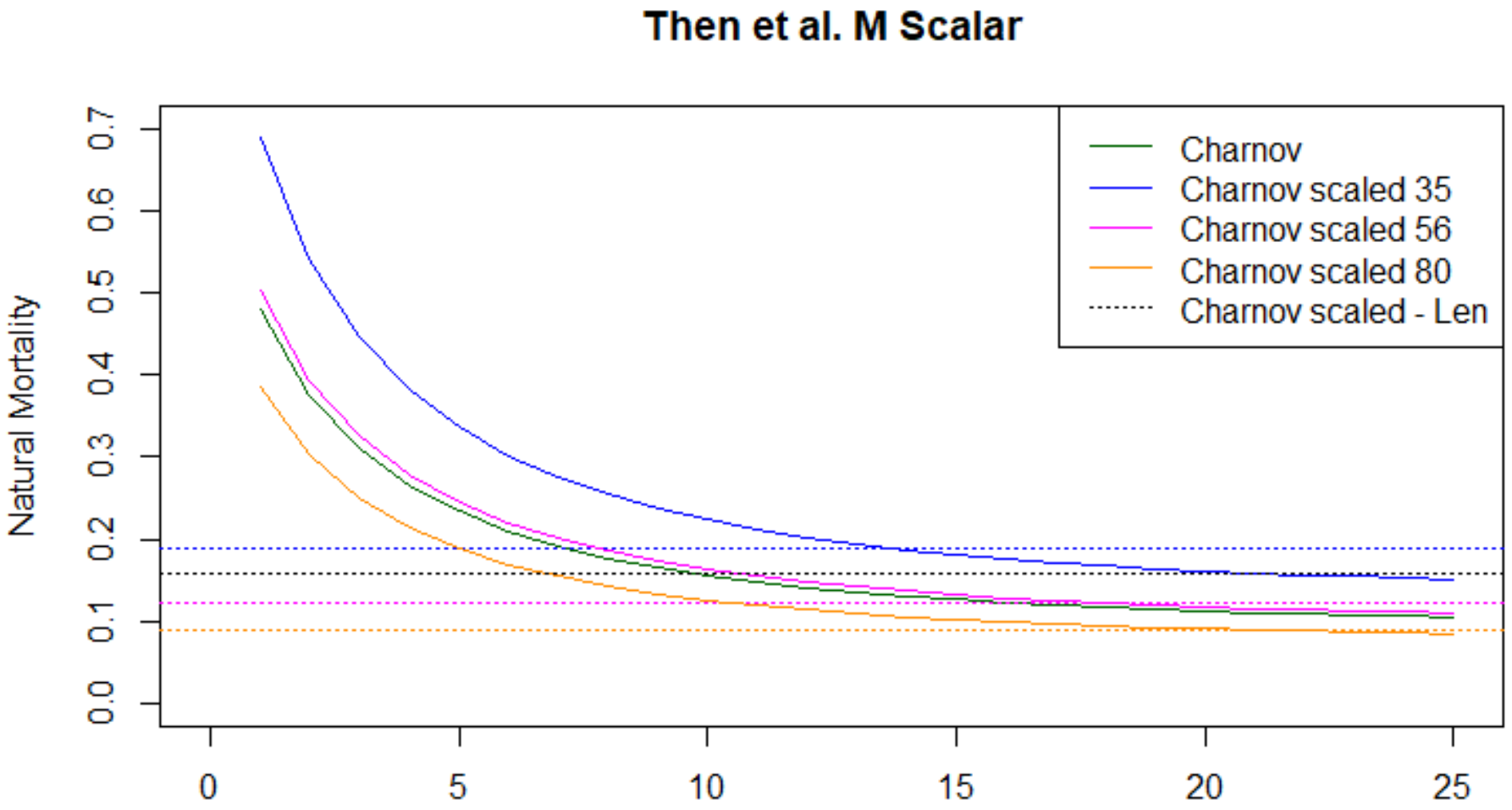
- Maximum observed age for SEDAR 36 update is 80
- 26 fish with ages greater than 35
- Hewitt and Hoenig point estimate with max age of 80: 0.05
- Then et al. (2014) natural mortality estimators

Evaluation of oldest fish

1. Otoliths from fish greater than 35 sent to SCDNR
   - 2 readers, one consensus age, some read twice on different paths
2. Otoliths from fish greater than 35 sent to bomb-radiocarbon paper author (P. Sanchez, Texas A&M)
3. General EDA


SCDNR consensus
Texas A&M
30
40
50
60
70
80
90
Beaufort count


Hewitt and Hoenig M Scalar
Natural Mortality
0.0
0.1
0.2
0.3
0.4
0.5
0
5
10
15
20
25
Charnov
Charnov scaled 35
Charnov scaled 56
Charnov scaled 80


Then et al. M Scalar
Natural Mortality
0.0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0
5
10
15
20
25
Charnov
Charnov scaled 35
Charnov scaled 56
Charnov scaled 80
Charnov scaled - Len

Natural Mortality Point Estimates

Method	Max age = 35	Max age = 56	Max age = 80
Hewitt and Hoenig	0.12	0.07	0.05
Then et al.	0.19	0.12	0.09

- Then et al. natural mortality estimate based on Linf and k growth parameters =0.15 (max age for scaling?)

References

- Costa, P., A. Braga, J. Rubinich, C. Monteiro-Neto. 2011. Age and growth of the snowy grouper, Epinephelus niveatus, off the Brazilian coast. Journal of the Marine Biological Association of the UK. 92. 10.1017/S0025315411000142.

- Sanchez P.J., J.P. Pinsky, J.R. Rooker . 2019. Bomb Radiocarbon Age Validation of Warsaw Grouper and Snowy Grouper, Fisheries 44 (11), 524-533

- Then, A. Y., Hoenig, J. M., Hall, N. G., and Hewitt, D. A. Evaluating the predictive performance of empirical estimators of natural mortality rate using information on over 200 fish species. – ICES Journal of Marine Science, 72: 82–92.