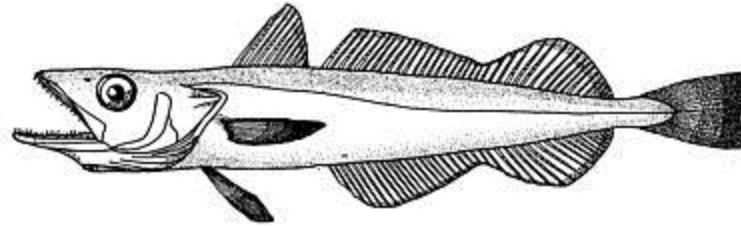


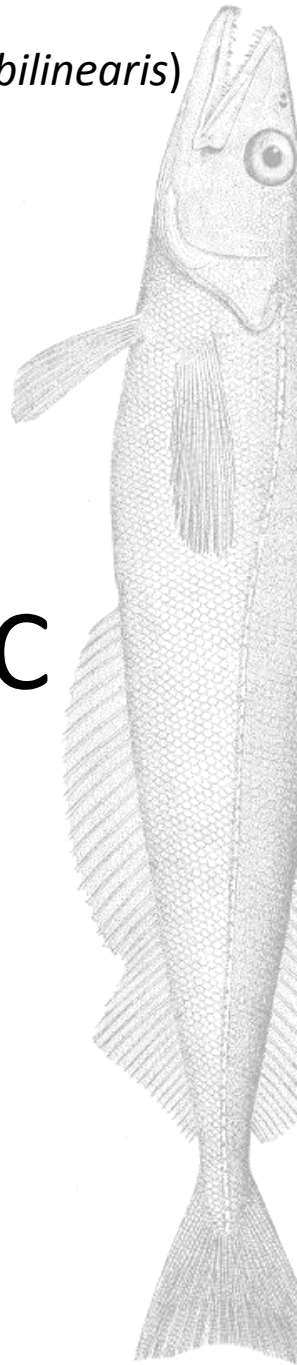


Red Hake (*Urophycis chuss*)



Offshore Hake (*Merluccius albidus*)

Silver Hake (*Merluccius bilinearis*)



# SSC Whiting Report to NEFMC

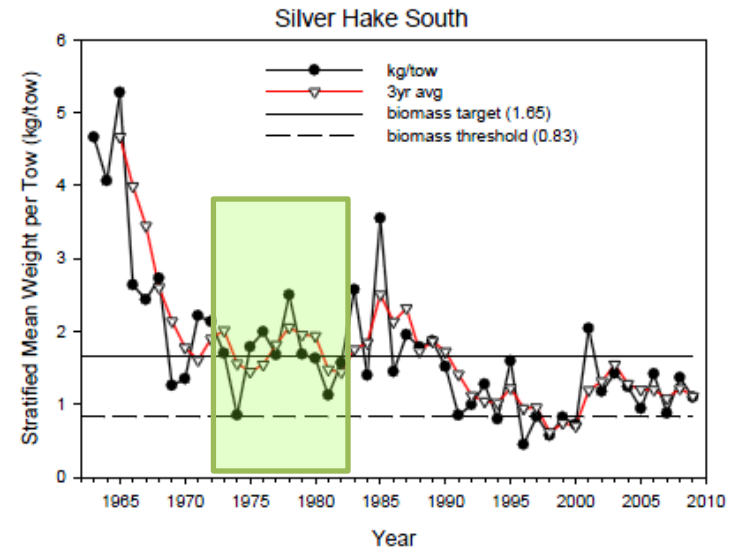
Chris Legault  
Scientific and Statistical Committee  
27 September 2011  
Danvers, MA

# Request to SSC

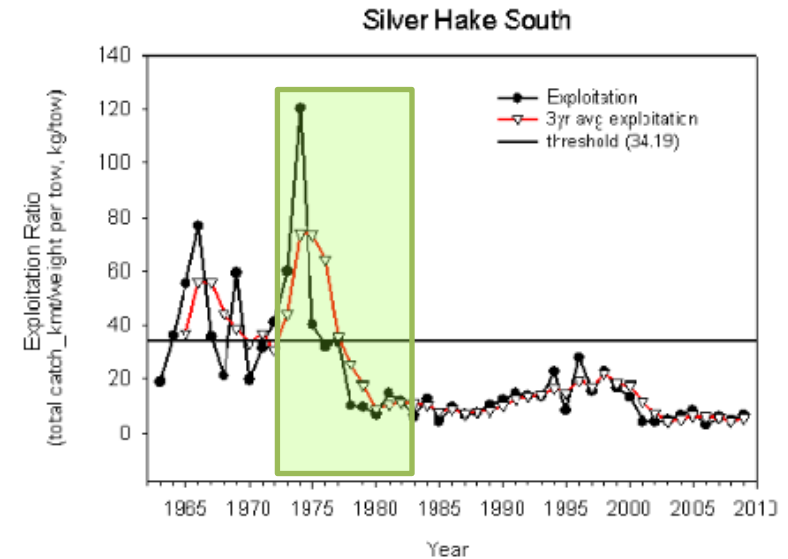
- Recommend ABCs
  - 2 red hake stocks (northern and southern)
  - 2 silver hake stocks (northern and southern)
  - Offshore hake
- SSC meetings
  - April 2011 provide Whiting PDT methods guidance
  - August 2011 set ABCs

# Whiting SARC 51

- Index based assessments
  - Bmsy proxy from survey during stable period
    - Red hake 1980-2010
    - Silver hake 1973-1982
  - Fmsy proxy
    - Red hake AIM analysis
    - Silver hake exploitation index from same period
  - Current B and F
    - 3 year moving averages
- Red and silver hake in N and S not overfished and overfishing not occurring



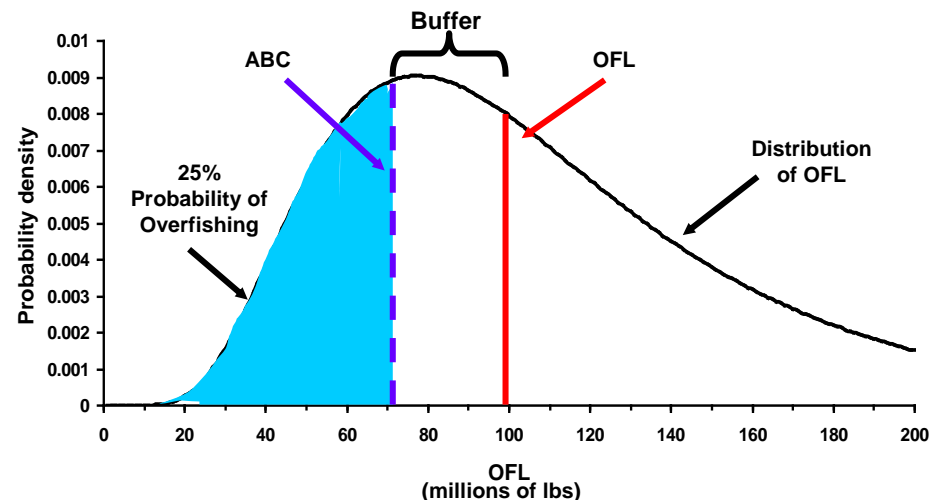
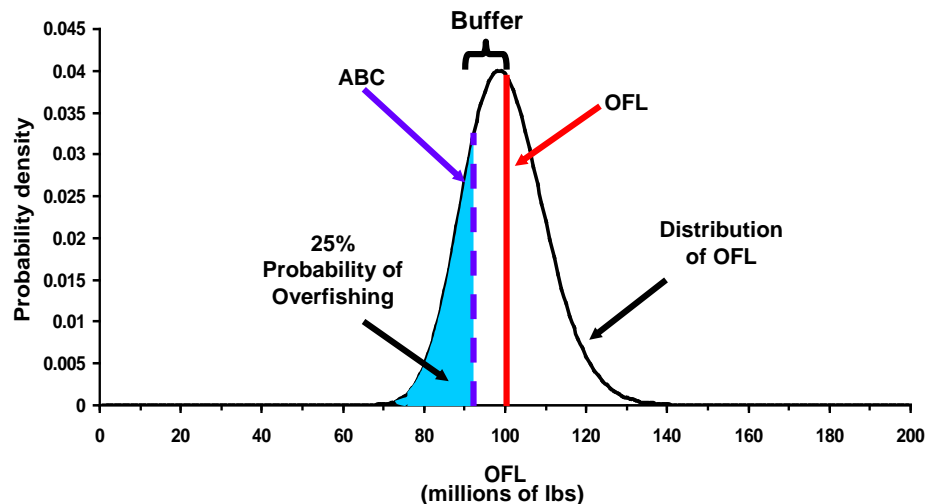
A8. Fall survey biomass (arithmetic mean) and the SARC 51 accepted biomass reference point for the southern stock of silver hake.



A9. Exploitation indices (ratio of catch to fall survey index) and the SARC 51 accepted overfishing threshold for the southern stock of silver hake.

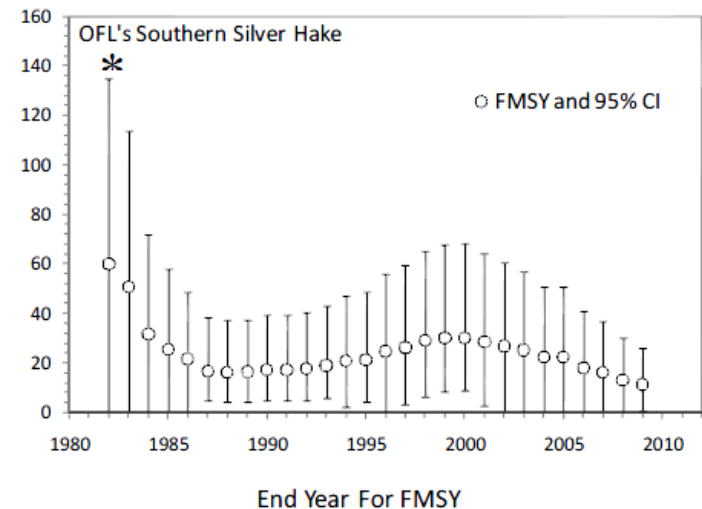
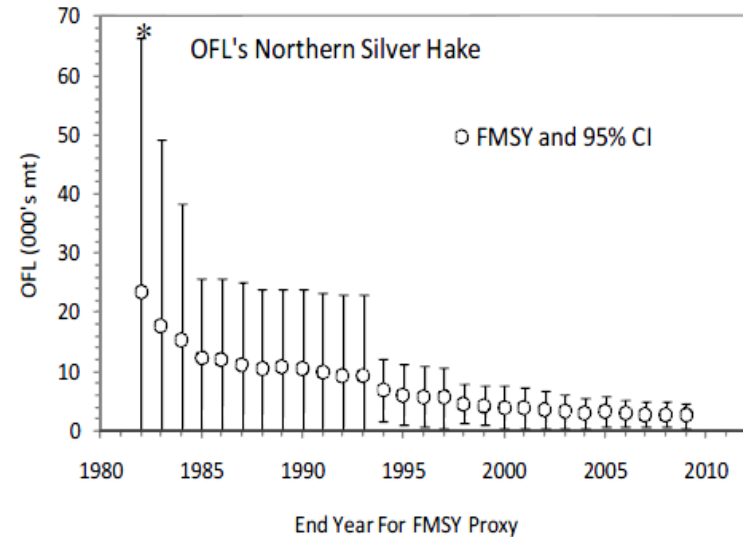
# ABC Method

- Account for uncertainty in both Fmsy proxy and current B
  - More uncertainty means lower ABC for a given probability of overfishing



# Caveats

- No analytical assessment
  - Cannot conduct risk analysis
- Silver hake
  - Uncertainty versus bias
    - Years selected for reference point
    - Productivity
    - Few old fish observed
- SSC ABC imply sudden large increase in catch for some stocks
  - Gradual increase suggested



# SSC Recommendations

The SSC recommends the following ABCs for the whiting stocks, but notes that the ABC in any of the rows in Table 1 which are not crosshatched can be selected by the Council as the ABC for that stock based on its risk tolerance:

- 244 mt for northern red hake.
- 3,063 mt for southern red hake.
- 13,177 mt for northern silver hake.
- 32,635 mt for southern silver hake.
- Setting a combined offshore hake and southern silver hake ABC, calculated as 1.04 multiplied by the Council selected ABC for southern silver hake.



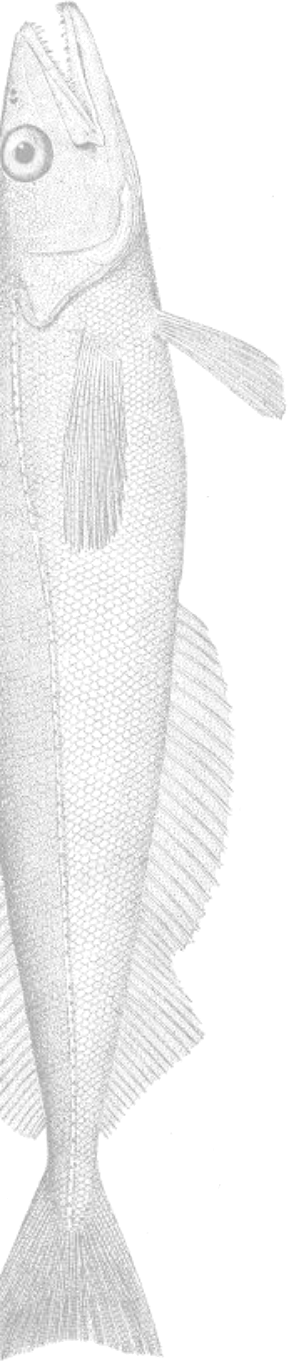
# Red Hake

| Red Hake North |            |                        | ABC- percentage of current catch |             |             |             |
|----------------|------------|------------------------|----------------------------------|-------------|-------------|-------------|
| Percentile OFL | ABC (mt)   | Prob ABC > 50%ile Fmsy | 2010                             | 3yr Avg     | 5 yr Avg    | 10y Avg     |
| 5              | 75         | 0.00                   | 24%                              | 37%         | 35%         | 31%         |
| 10             | 134        | 0.00                   | 43%                              | 66%         | 62%         | 55%         |
| 25             | 223        | 0.00                   | 72%                              | 111%        | 103%        | 92%         |
| <b>30</b>      | <b>244</b> | <b>0.00</b>            | <b>78%</b>                       | <b>121%</b> | <b>113%</b> | <b>100%</b> |
| 40             | 280        | 0.08                   | 90%                              | 139%        | 130%        | 115%        |
| 50             | 314        | 0.37                   | 101%                             | 156%        | 146%        | 129%        |

| Red Hake South |             |                        | ABC- percentage of current catch |             |             |             |
|----------------|-------------|------------------------|----------------------------------|-------------|-------------|-------------|
| Percentile OFL | ABC (mt)    | Prob ABC > 50%ile Fmsy | 2010                             | 3yr Avg     | 5 yr Avg    | 10y Avg     |
| 5              | 2263        | 0.00                   | 167%                             | 156%        | 151%        | 165%        |
| 10             | 2524        | 0.00                   | 187%                             | 174%        | 168%        | 184%        |
| 25             | 2954        | 0.10                   | 218%                             | 203%        | 197%        | 215%        |
| <b>30</b>      | <b>3063</b> | <b>0.16</b>            | <b>226%</b>                      | <b>211%</b> | <b>204%</b> | <b>223%</b> |
| 40             | 3259        | 0.27                   | 241%                             | 224%        | 217%        | 237%        |
| 50             | 3448        | 0.43                   | 255%                             | 237%        | 230%        | 251%        |

# Silver Hake



| Silver Hake North |              |                        | ABC- percentage of current catch |             |             |             |
|-------------------|--------------|------------------------|----------------------------------|-------------|-------------|-------------|
| Percentile OFL    | ABC (mt)     | Prob ABC > 50%ile Fmsy | 2010                             | 3yr Avg     | 5 yr Avg    | 10y Avg     |
| 5                 | 5363         | 0.00                   | 216%                             | 358%        | 372%        | 295%        |
| 10                | 7434         | 0.00                   | 300%                             | 496%        | 516%        | 408%        |
| <b>25</b>         | <b>13177</b> | <b>0.00</b>            | <b>532%</b>                      | <b>878%</b> | <b>915%</b> | <b>724%</b> |
| 35                | 17300        | 0.00                   | 698%                             | 1153%       | 1201%       | 951%        |
| 40                | 19600        | 0.04                   | 791%                             | 1307%       | 1361%       | 1077%       |
| 50                | 24840        | 0.52                   | 1004%                            | 1659%       | 1728%       | 1367%       |

| Silver Hake South |              |                        | ABC- percentage of current catch |             |             |             |
|-------------------|--------------|------------------------|----------------------------------|-------------|-------------|-------------|
| Percentile OFL    | ABC (mt)     | Prob ABC > 50%ile Fmsy | 2010                             | 3yr Avg     | 5 yr Avg    | 10y Avg     |
| 5                 | 13072        | 0.00                   | 184%                             | 185%        | 210%        | 191%        |
| 10                | 18290        | 0.00                   | 257%                             | 259%        | 294%        | 267%        |
| <b>25</b>         | <b>32635</b> | <b>0.00</b>            | <b>459%</b>                      | <b>463%</b> | <b>525%</b> | <b>476%</b> |
| 35                | 43090        | 0.00                   | 606%                             | 611%        | 693%        | 629%        |
| 40                | 48860        | 0.04                   | 687%                             | 693%        | 786%        | 713%        |
| 50                | 62301        | 0.51                   | 876%                             | 884%        | 1002%       | 910%        |