equations

Model Symbols and Definitions

| Symbol | Definition |
| --- | --- |
|  | Year |
|  | Age class |
|  | Age at recruitment (age-2) |
|  | Plus group age (age-31 and older) |
|  | Sex (male or female) |
|  | Fleet (fixed (LL), trawl (TR)) |
|  | Logistic slope for fixed-gear selectivity (sex ) |
|  | Age at 50% selectivity for fixed gear (sex ) |
|  | Dome width parameter for trawl selectivity (sex ) |
|  | Age at peak selectivity for trawl gear (sex ) |
|  | Gamma spread parameter for dome-shaped trawl selectivity |
|  | Annual recruitment at age-2 |
|  | Numbers-at-age in year , age , sex |
|  | Total instantaneous mortality |
|  | Fleet-specific fishing mortality |
|  | Total fishing mortality across fleets |
|  | Natural mortality |
|  | Selectivity-at-age by fleet |
|  | Retention-at-age by fleet |
|  | Discard mortality rate |
|  | Weight-at-age |
|  | Maturity-at-age |
|  | Catch-at-age by fleet |
|  | Total catch in year |
|  | Total biomass in year |
|  | Female spawning stock biomass in year |
|  | Survey catchability coefficients |
|  | Survey indices (longline, trawl) |
|  | Survey index standard deviations |
|  | Survey observation error |
|  | Sample size for compositions |
|  | Composition Number of individuals sampled at age |

Population dynamics

Selectivity Functions  
Fixed Gear (Logistic)

Trawl Gear (Dome-shaped Gamma)

Equations describing observation data

Annual Catch

Annual total biomass

Annual spawning stock biomass (SSB)

Longline Survey (Abundance Index)

Bottom Trawl Survey (Biomass Index)

Age Composition Data  
Multinomial Sampling

Sample sizes:

* Longline survey and fixed gear fleet:
* Trawl survey and trawl fleet: