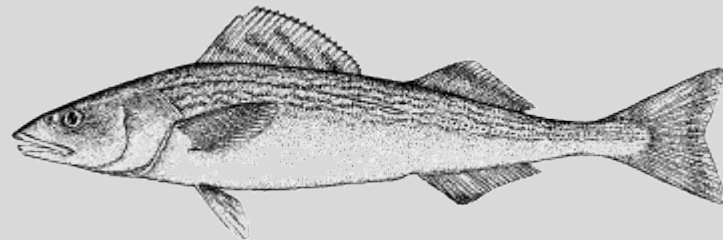


Stock assessment methods for Chatham Strait sablefish (*Anoplopoma fimbria*)



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Alaska Dept. of Fish and Game

Kristen Green
Mike Vaughn
Jennifer Stahl
Kamala Carroll



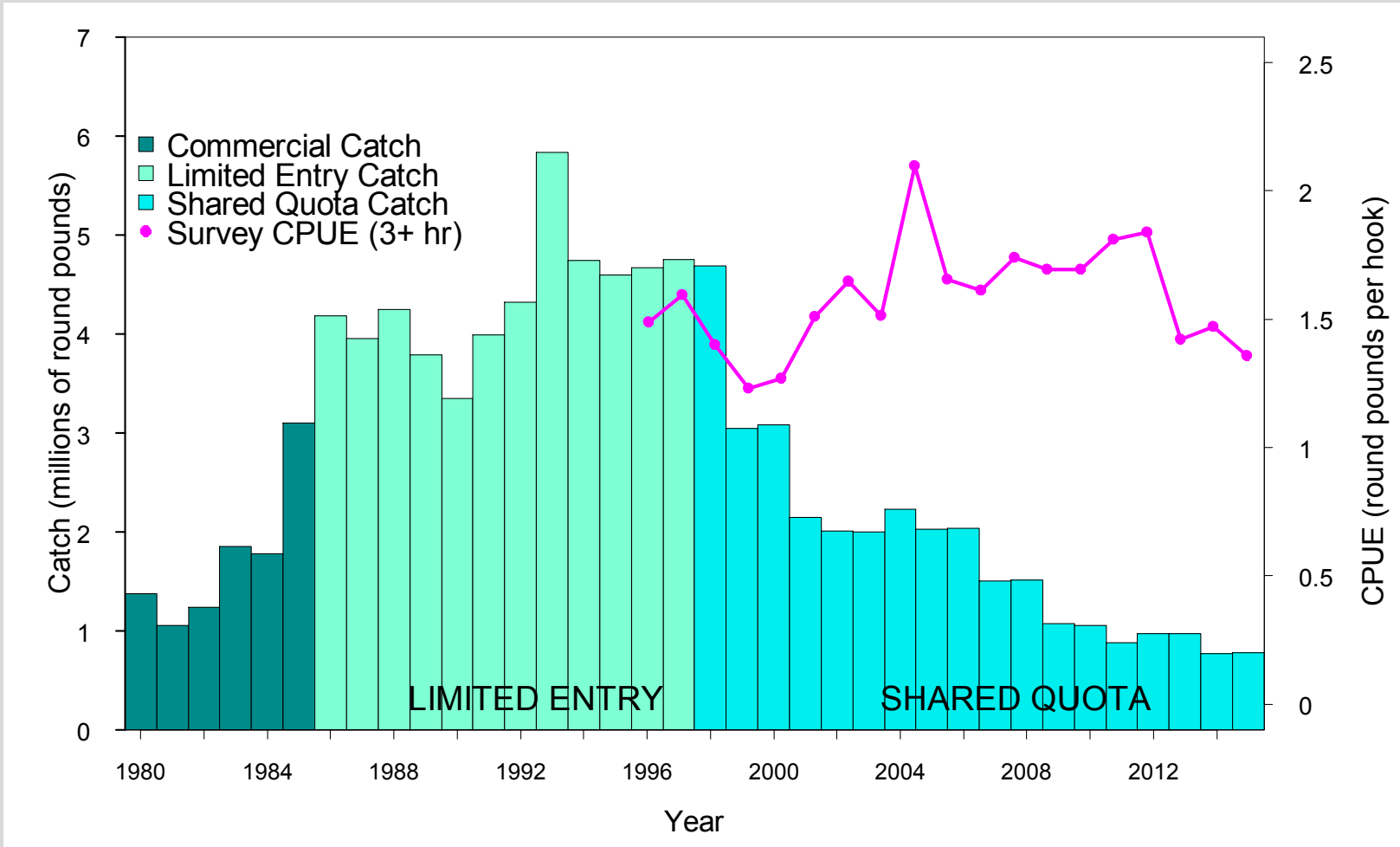
Chatham Strait sablefish: status and future



-
1. Current methods and conditions
 2. Improved mark-recapture methods
 3. Proposed new model structure
 4. Comments and Input

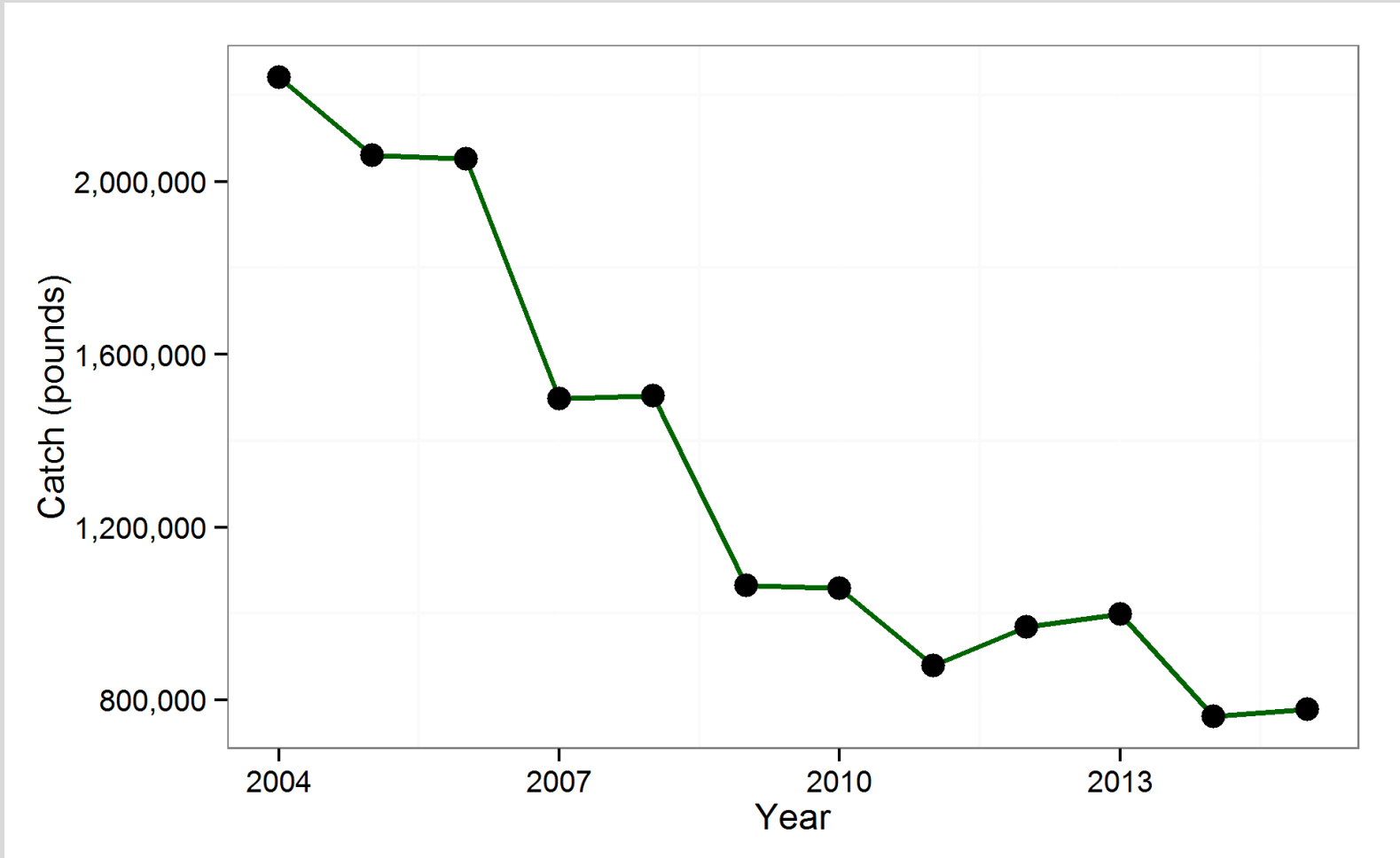


Chatham Strait sablefish: Survey CPUE





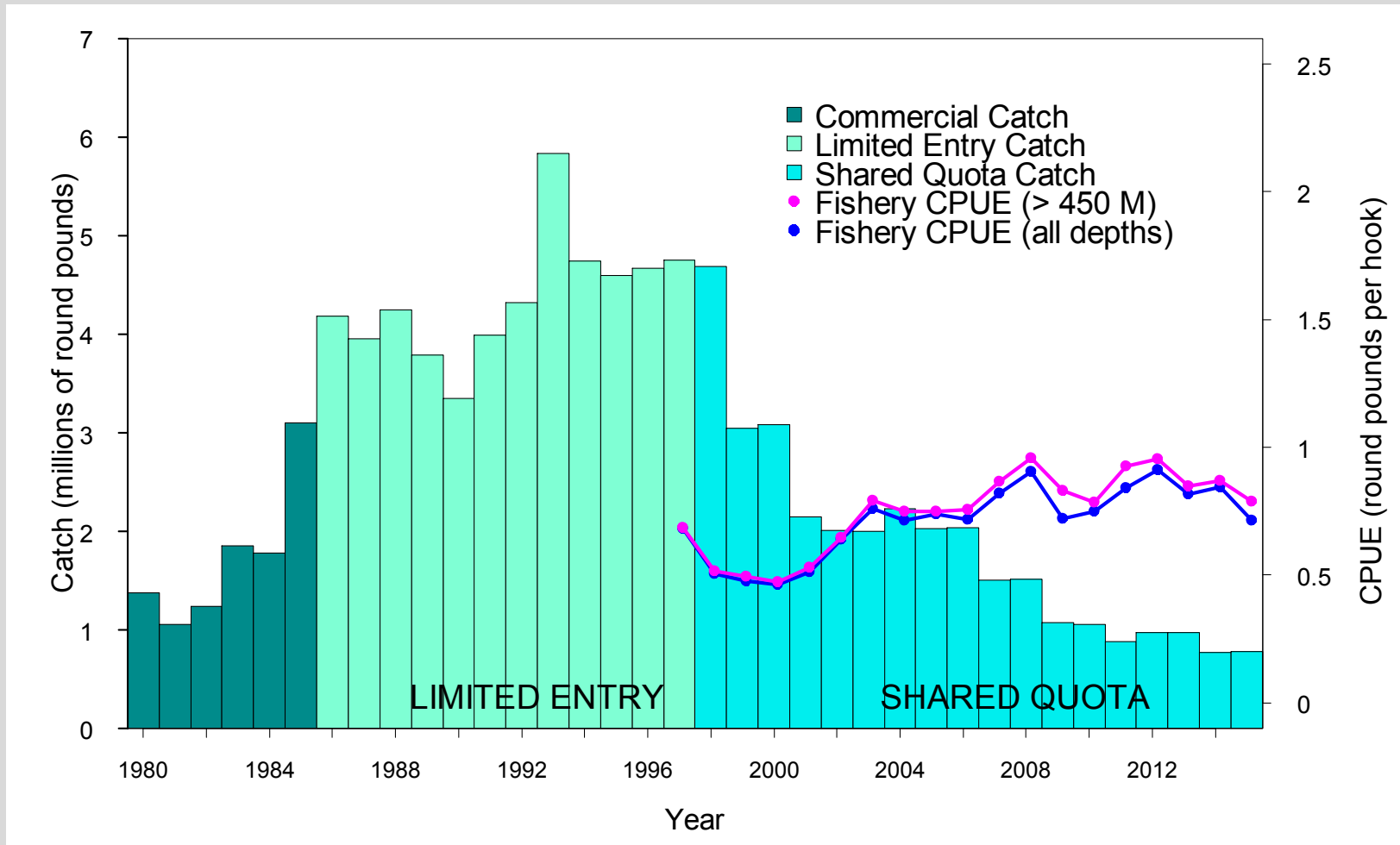
Chatham Strait sablefish: Catch



Catch



Chatham Strait sablefish: Fishery CPUE



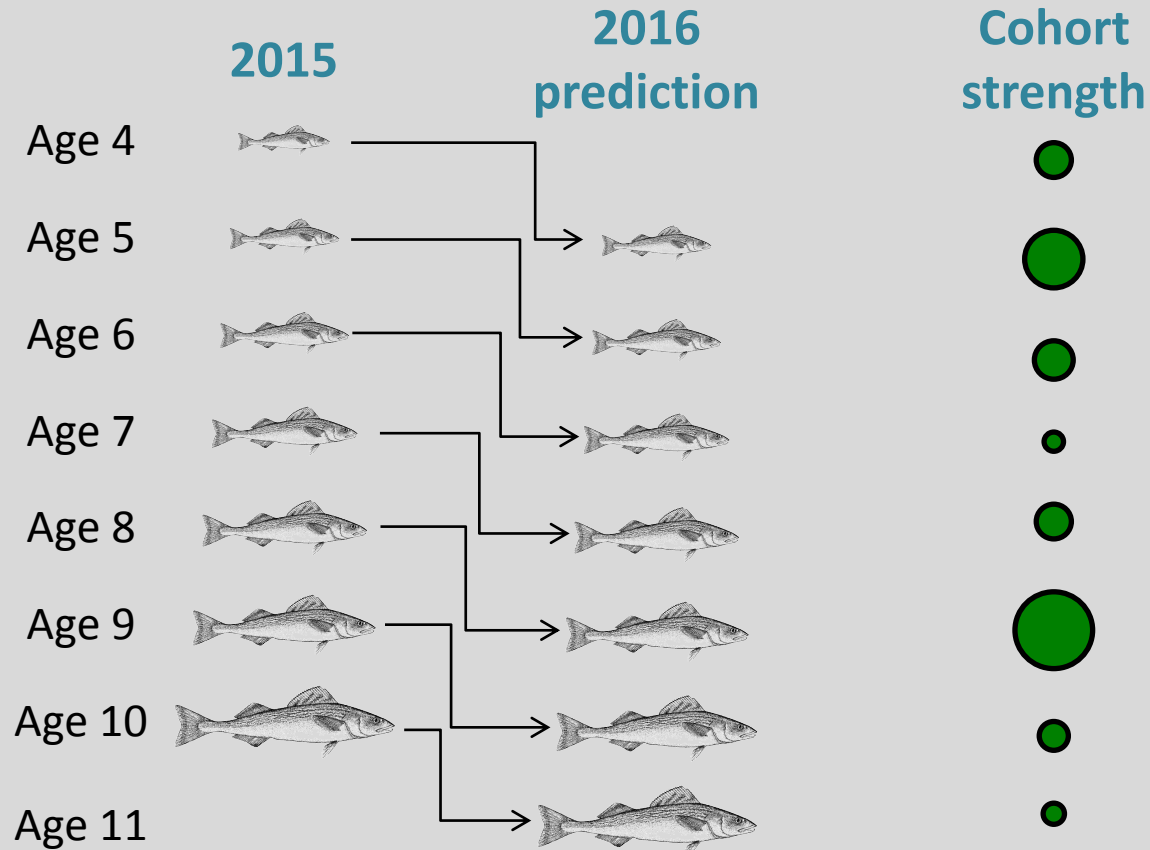


Chatham Strait sablefish: stock-assessment methods



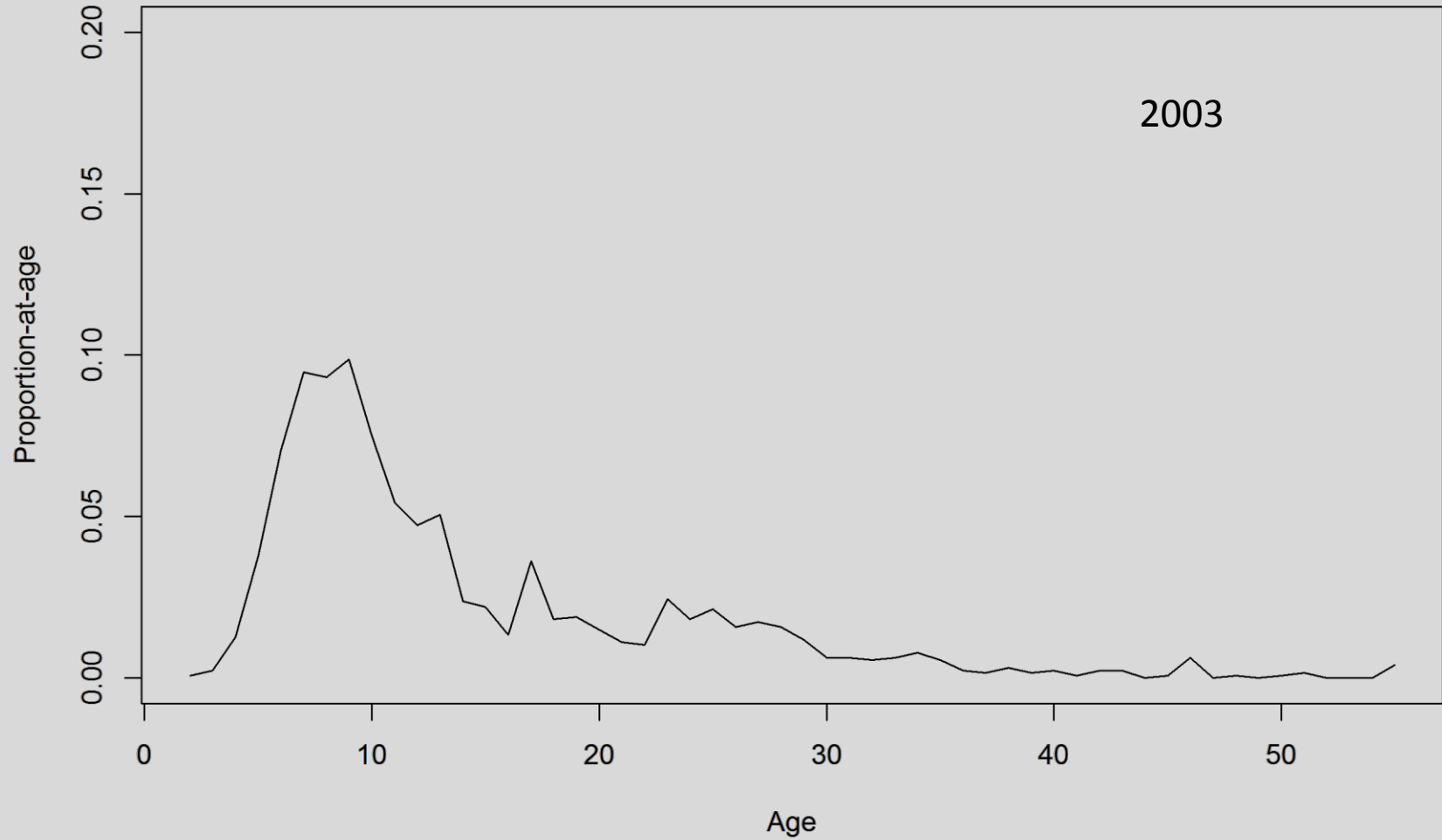
Mark-recapture defines abundance for fished population

Age-composition of commercial catch used to predict fished population and set quota



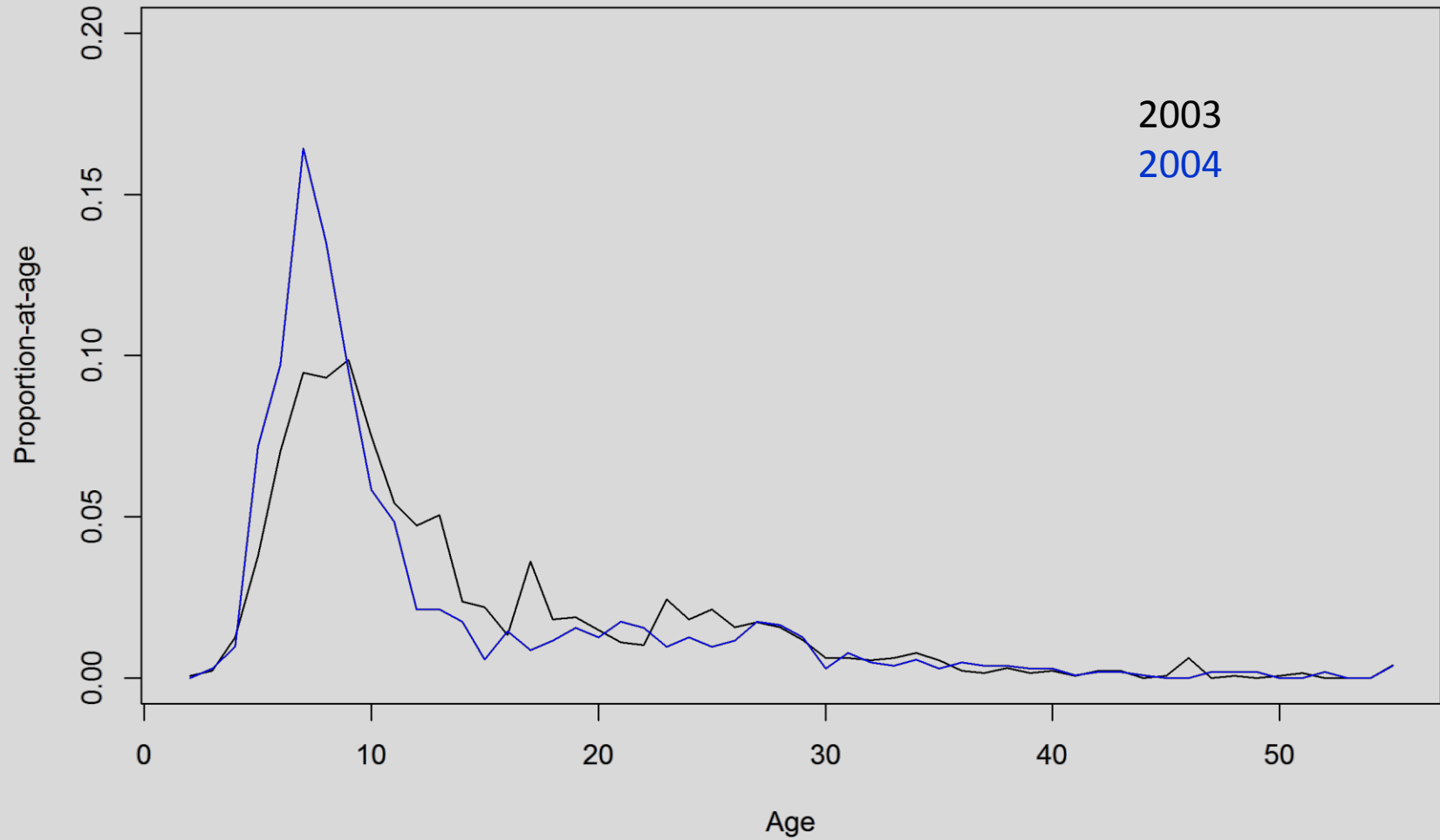


Chatham Strait sablefish: changes in age-structure



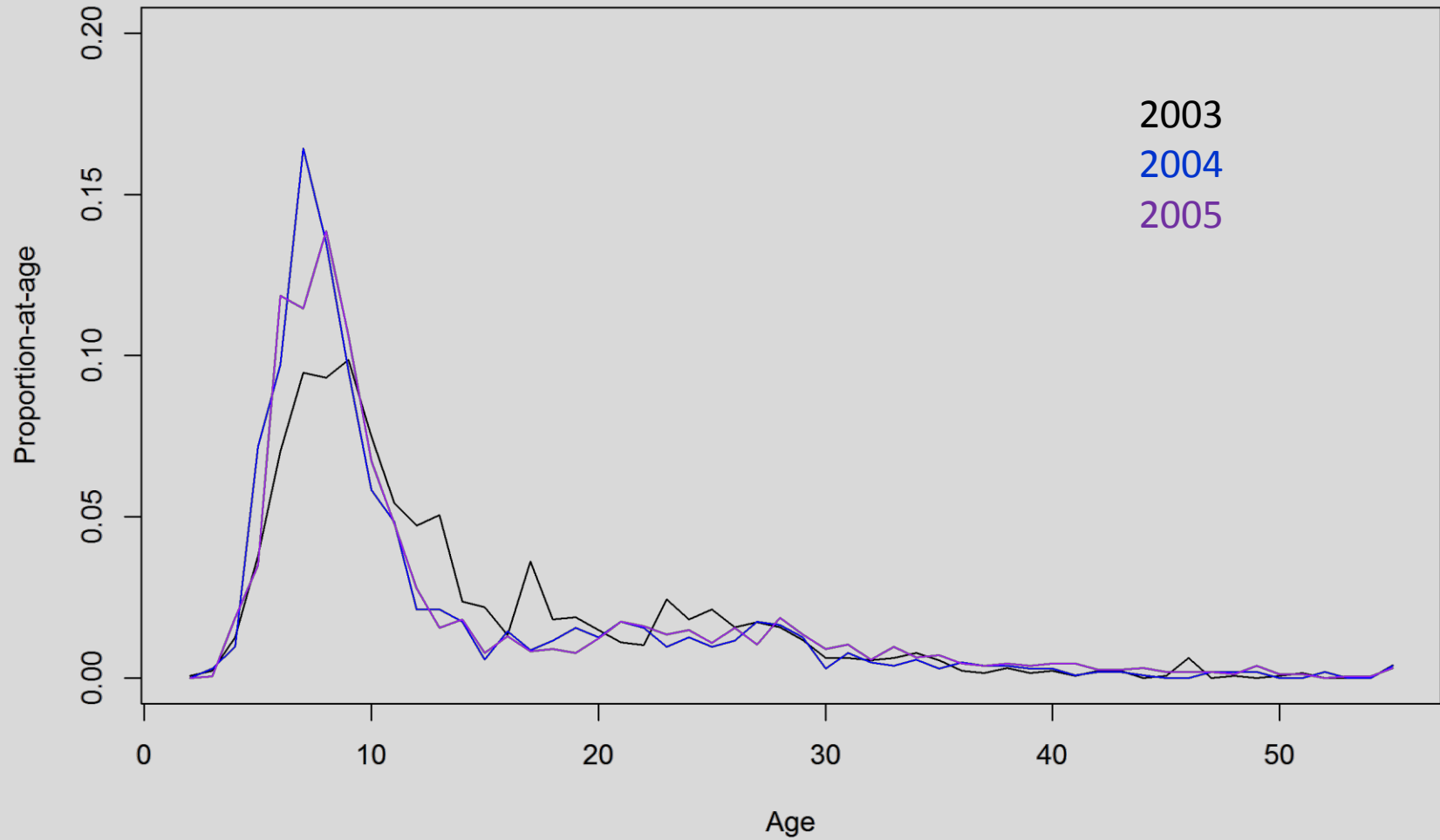


Chatham Strait sablefish: changes in age-structure



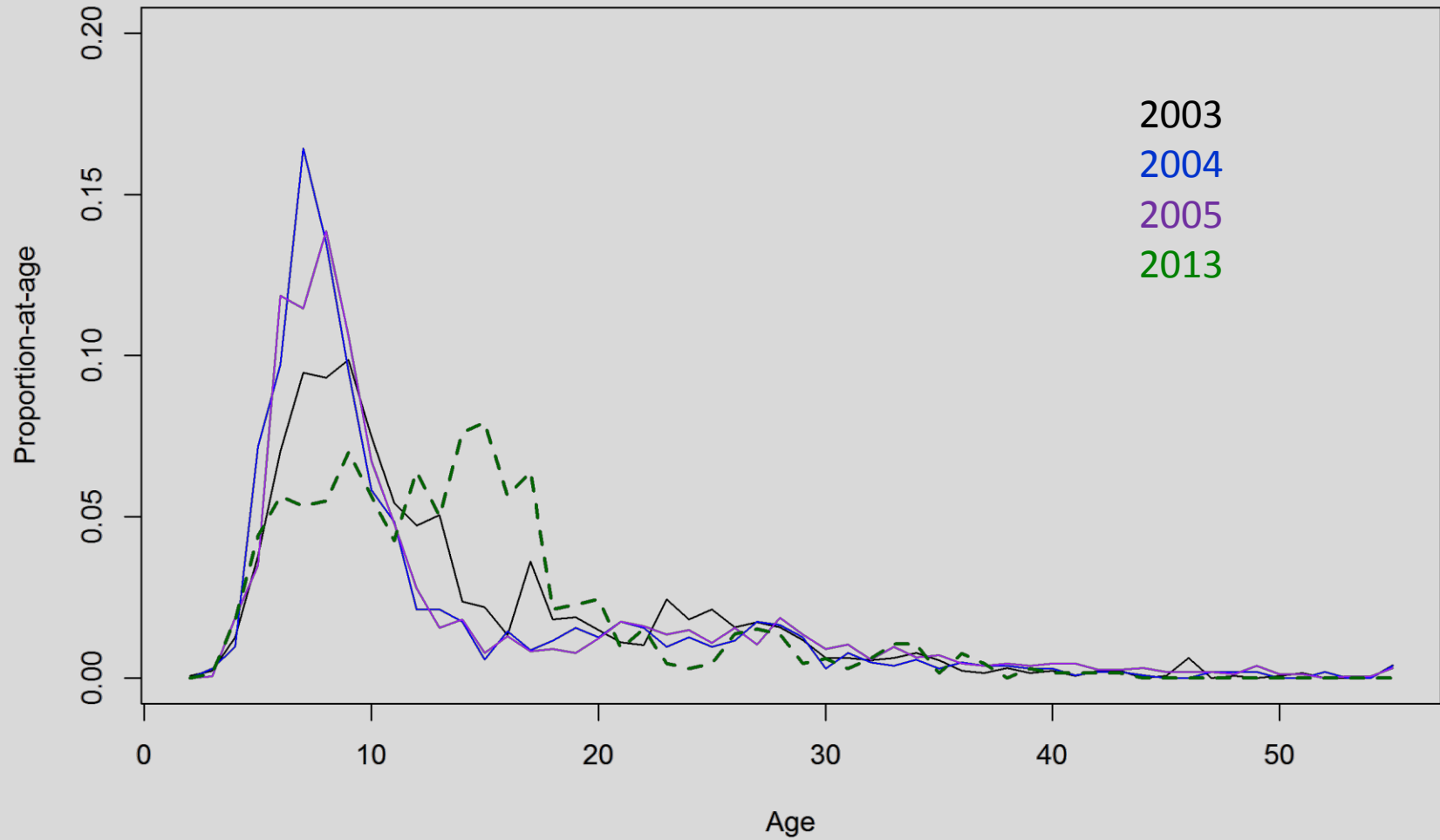


Chatham Strait sablefish: changes in age-structure



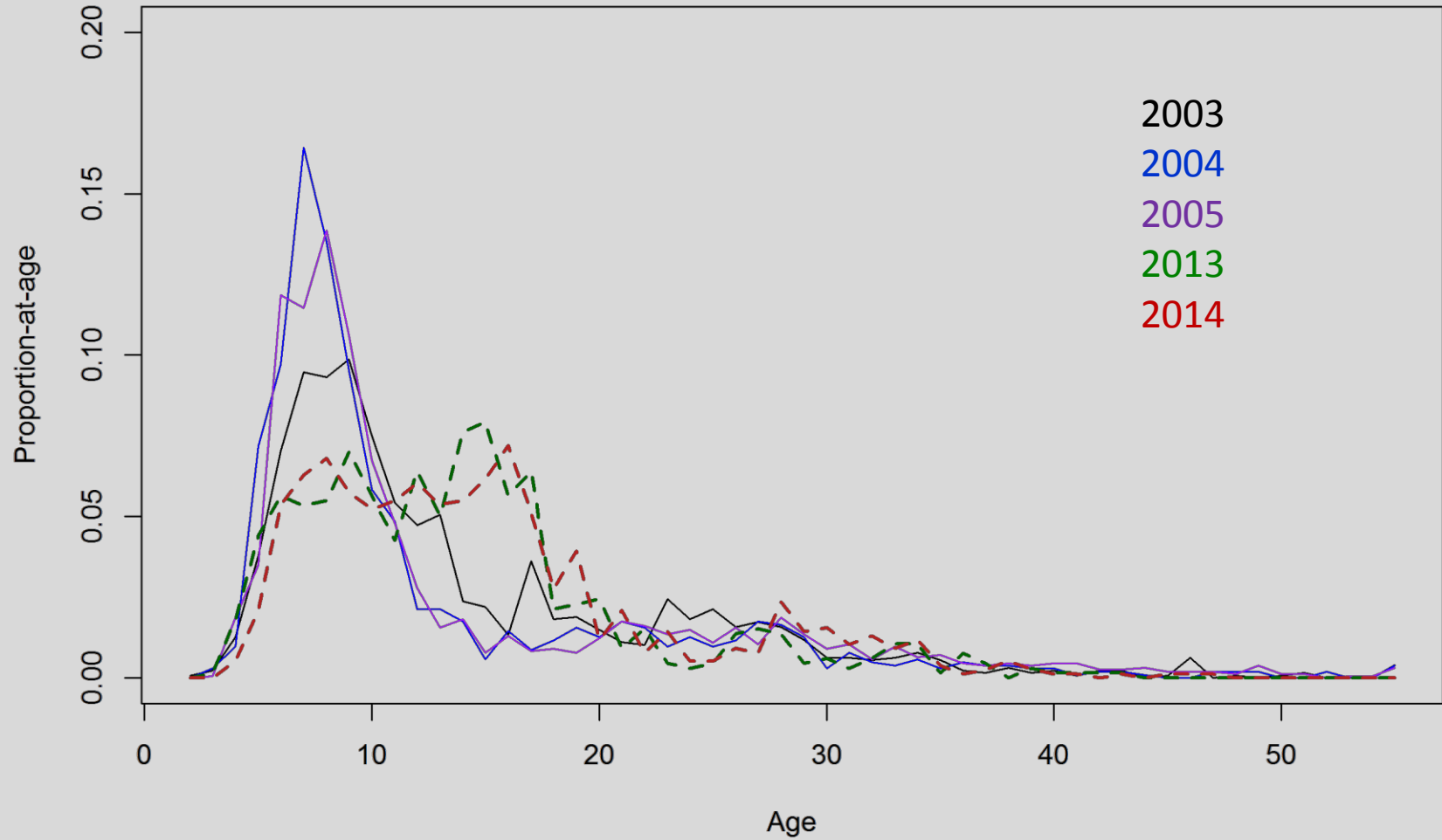


Chatham Strait sablefish: changes in age-structure



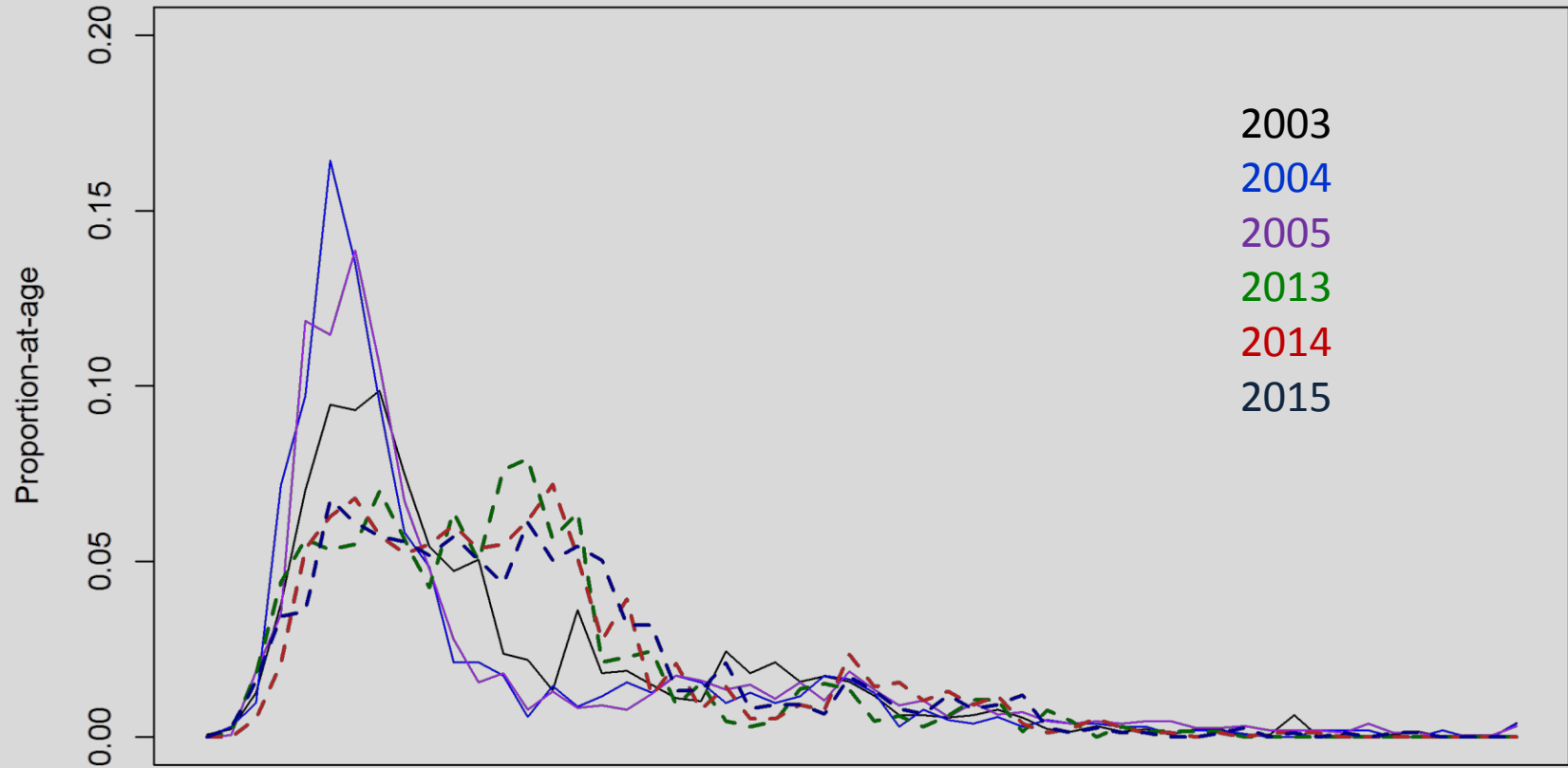


Chatham Strait sablefish: changes in age-structure



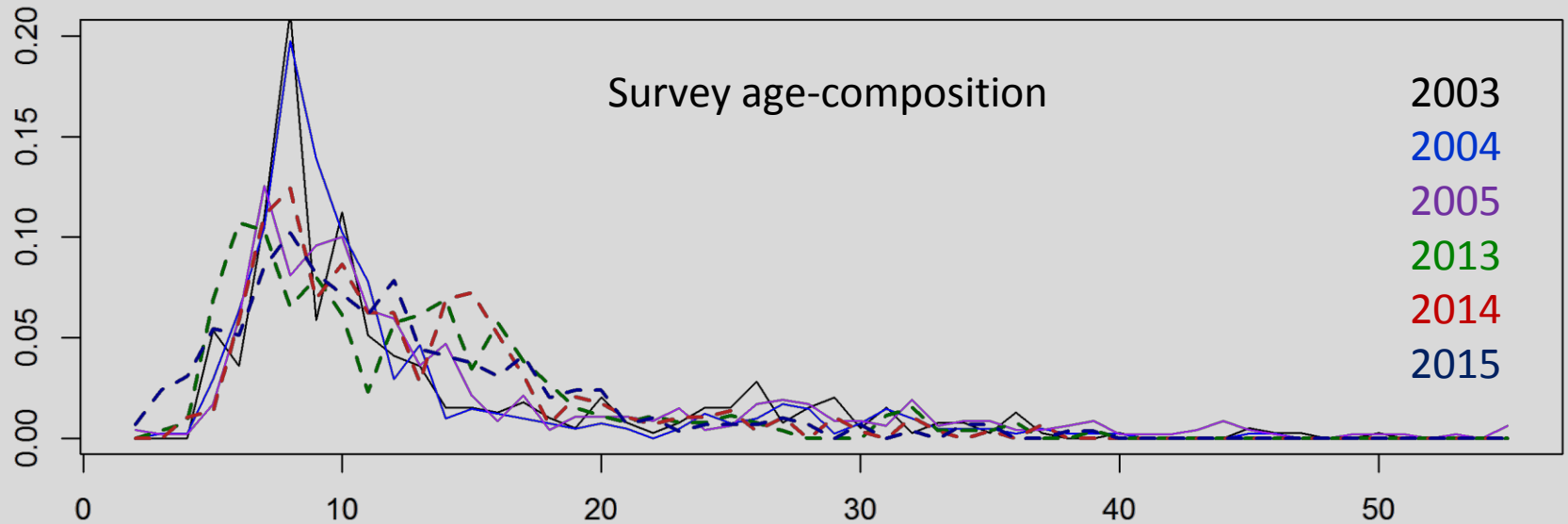
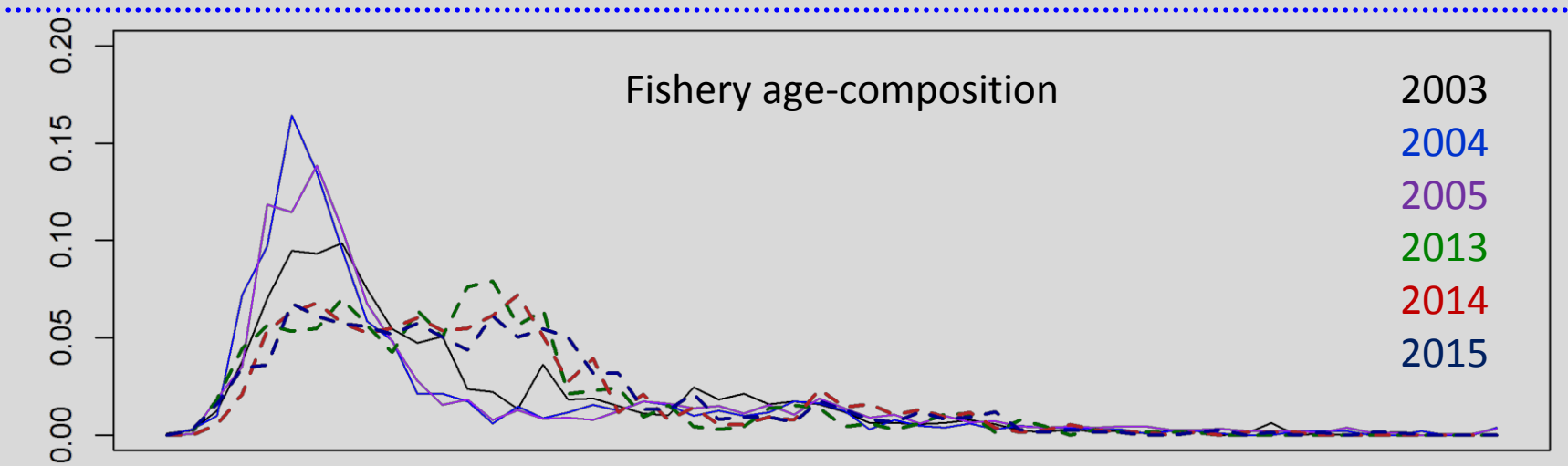


Chatham Strait sablefish: changes in age-structure





Chatham Strait sablefish: is this accurate??

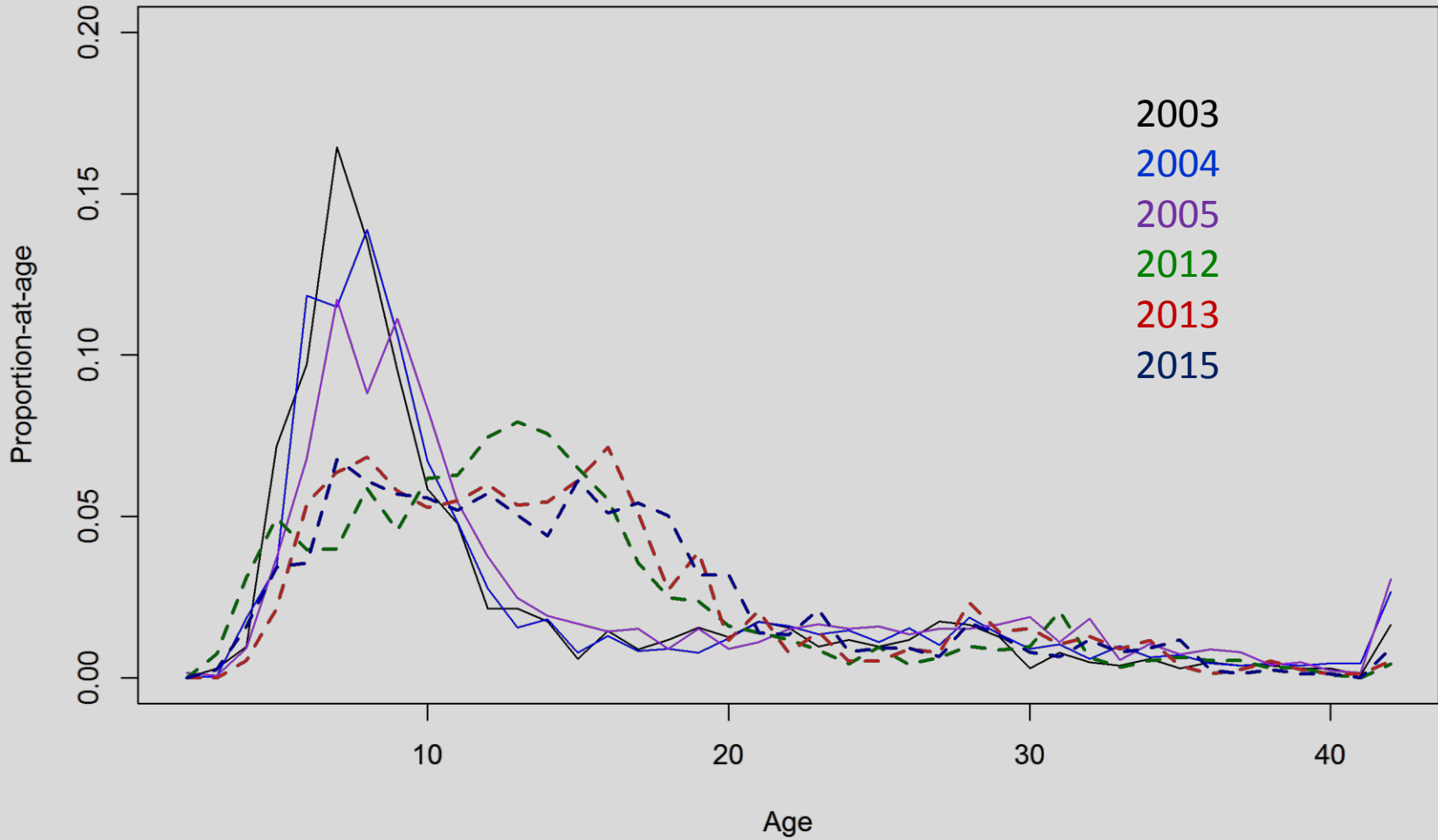




Chatham Strait sablefish: is this accurate??

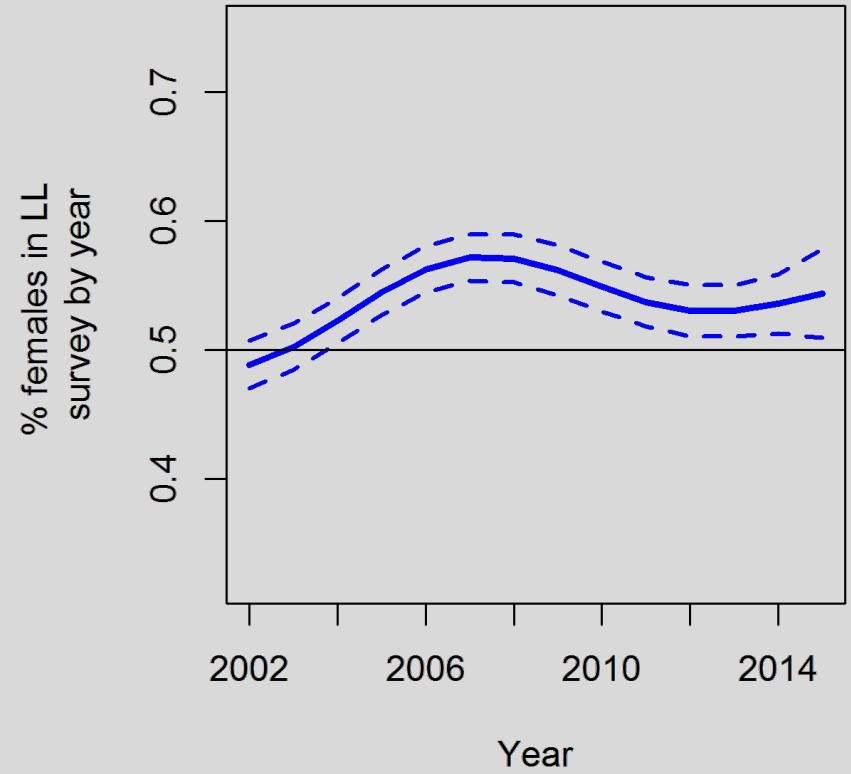
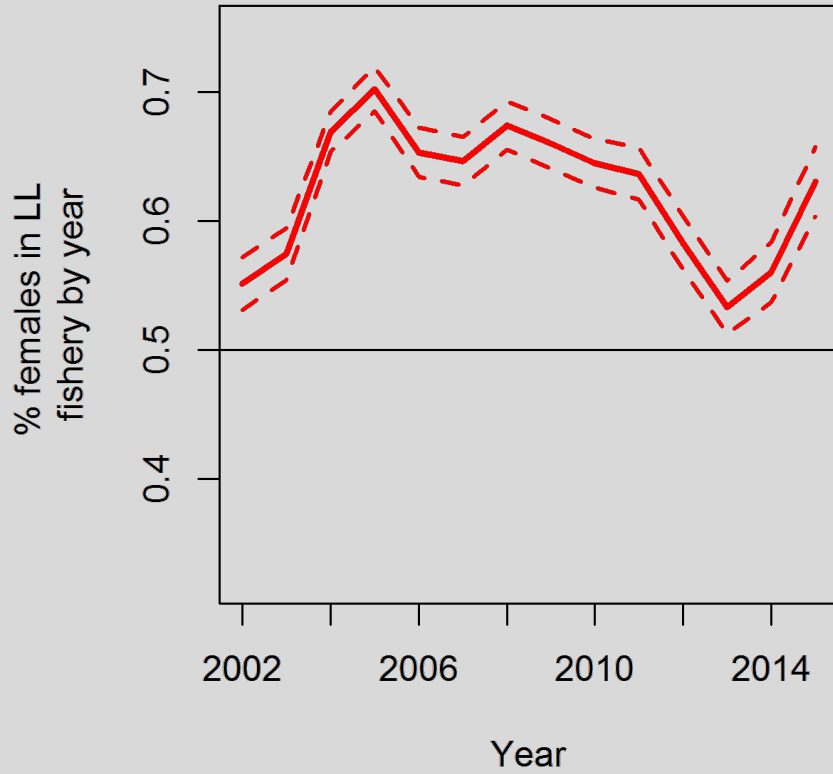


Pot survey age-composition



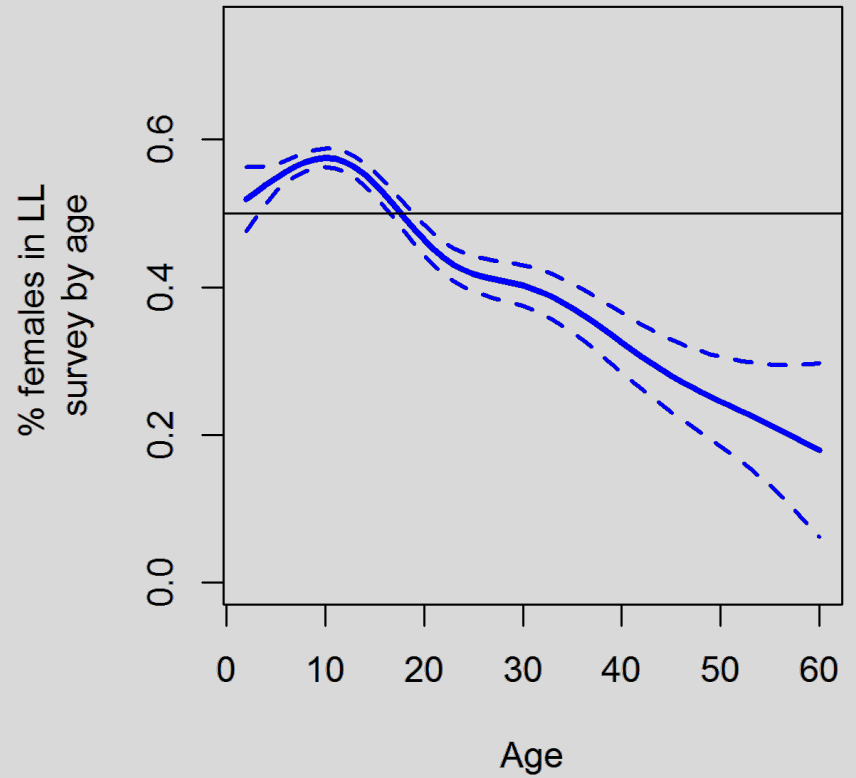
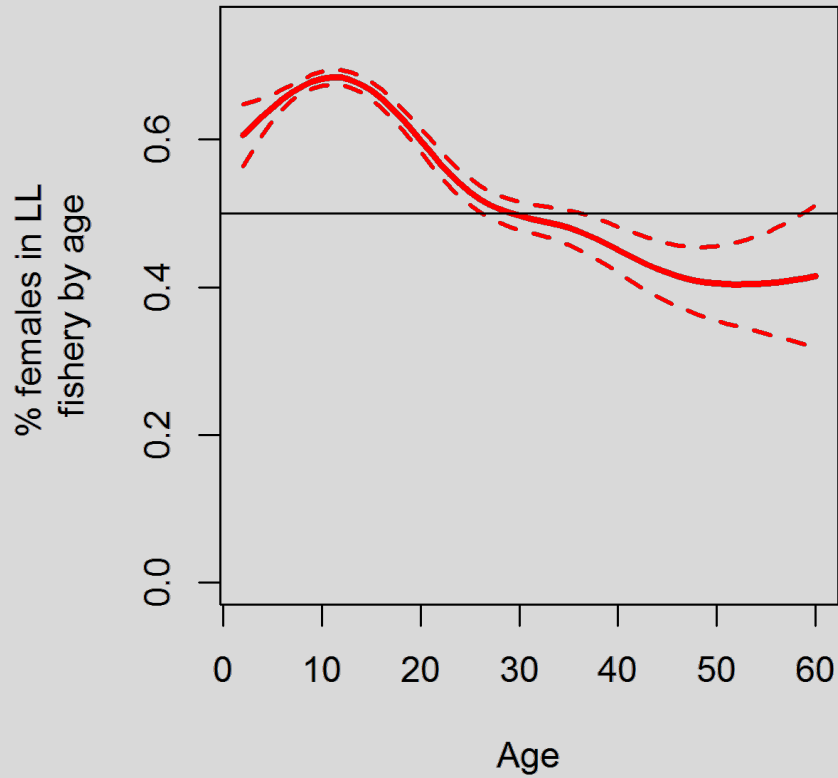


Chatham Strait sablefish: survey and fishery





Chatham Strait sablefish: survey and fishery





Chatham Strait sablefish



-
- A. Survey and fishery have different age-compositions
 - B. Survey has fewer females than the fishery
 - C. Fishery catches more larger fish (females)
 - D. Females and males have different growth rates
 - E. Catch probability different for males / females

The mark-recapture project is the cornerstone of stock assessment for Chatham Strait sablefish

Needs to be as accurate as possible



Chatham Strait sablefish: improved mark-recapture



Improvement in methodology to better account for specific population characteristics:

1. Adjust for unequal catch between sex and gear(s)
2. Adjust for mortality and fisheries removals
3. Multiple estimates of abundance in each season



Chatham Strait sablefish: new methods



Limitations of current stock assessment methods

1. Mark-recapture is a snapshot in time
2. Fishery and survey data not fully integrated
3. High inter-annual variability



Chatham Strait sablefish: new methods



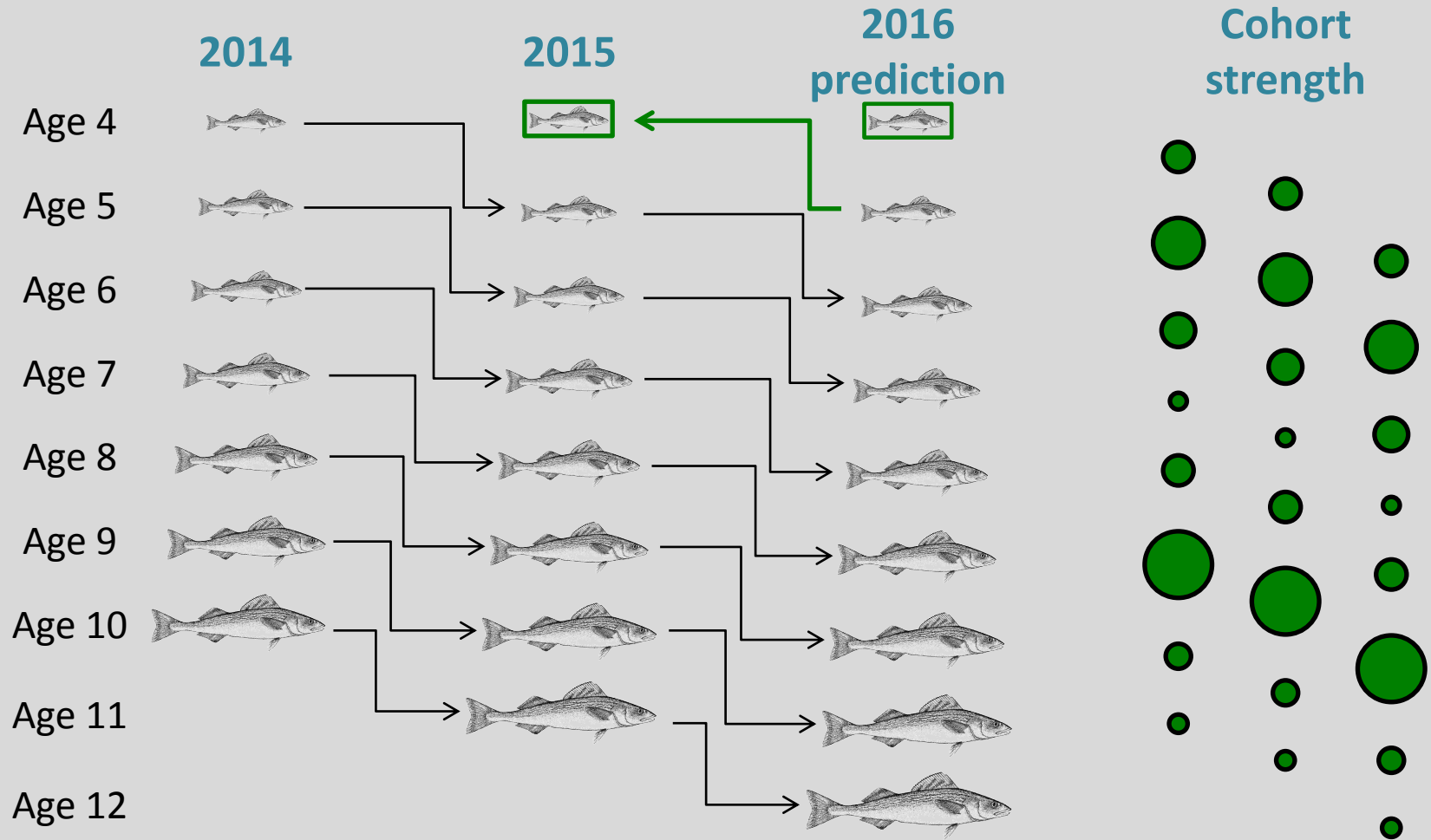
We have lots of information:

- ❖ total annual catch (commercial longline fishery);
- ❖ **mark-recapture estimates (ADF&G longline survey);**
- ❖ mark-recapture estimates (commercial longline fishery);
- ❖ sex/age composition data from the commercial fishery;
- ❖ sex/age composition data from the ADF&G longline survey;
- ❖ commercial fishery catch-per-unit effort (CPUE);
- ❖ ADF&G longline survey CPUE;
- ❖ Life history information

Integrate all of this together in
an age-structured model



Chatham Strait sablefish: age-structured model





Chatham Strait sablefish: age-structured model

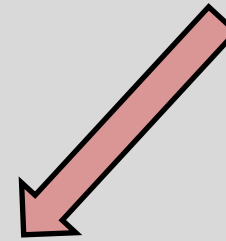
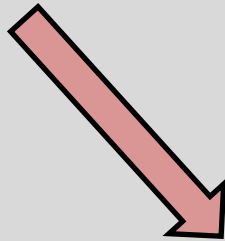


Observed data

- ❖ Total annual catch (sex specific)
- ❖ Mark-recapture estimates – fishery
- ❖ Mark-recapture estimates – survey
- ❖ CPUE – fisheries and longline survey
- ❖ Age-composition – fisheries and survey

Model outputs

- Total annual catch (sex specific)
- Mark-recapture estimates – fishery
- Mark-recapture estimates – survey
- CPUE – fisheries and longline survey
- Age-composition – fisheries and survey



Total annual catch (sex specific)
Mark-recapture estimates – fishery
Mark-recapture estimates – survey
CPUE – fisheries and longline survey
Age-composition – fisheries and survey

Objective function

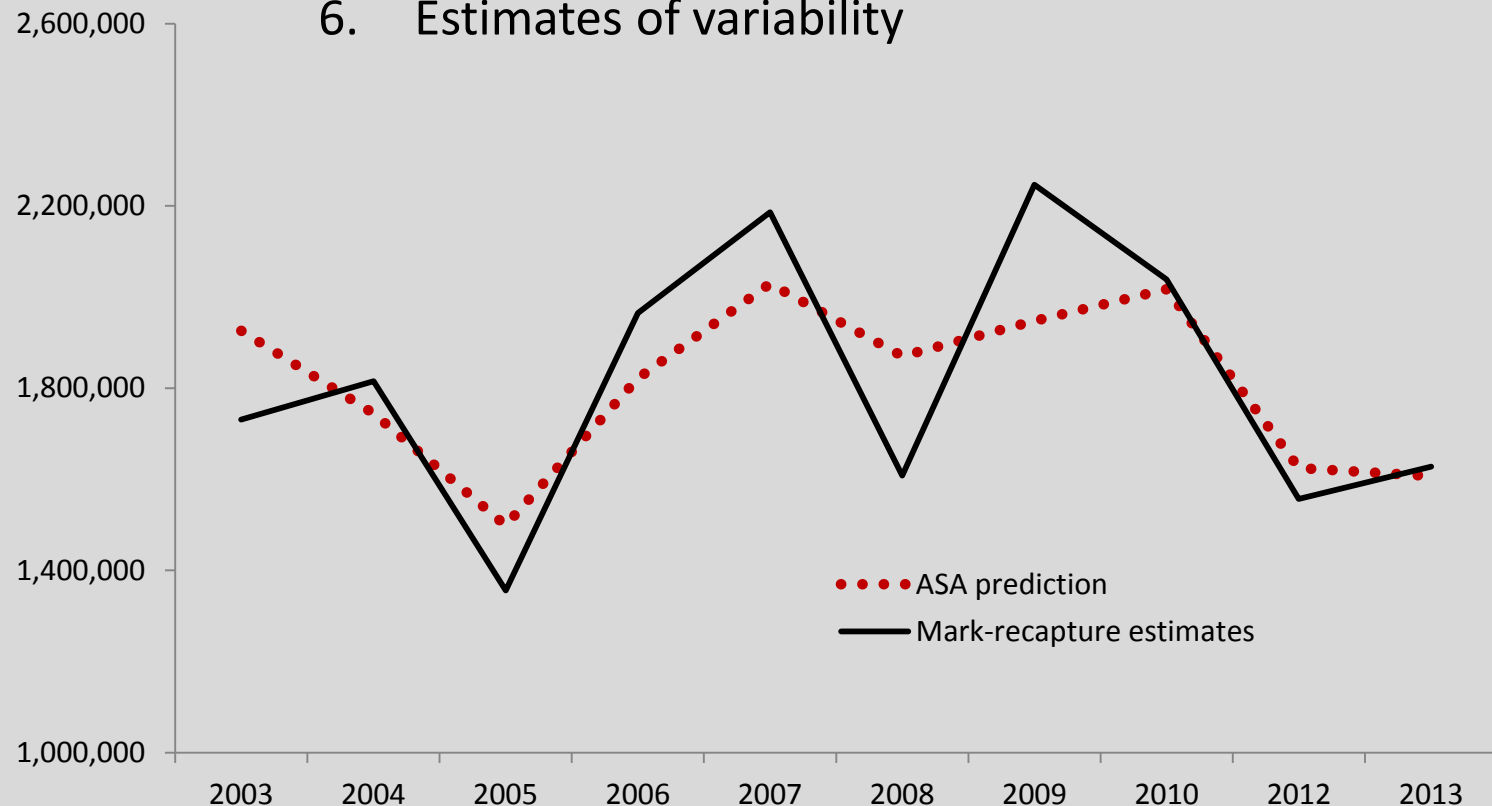


Chatham Strait sablefish: age-structured model



Advantages of the age-structured format

1. Assessment of entire population
2. Multiple sources of information
3. Uses longline survey mark-recapture
4. Able to skip years of MR project
5. Stabilizes MR estimates
6. Estimates of variability



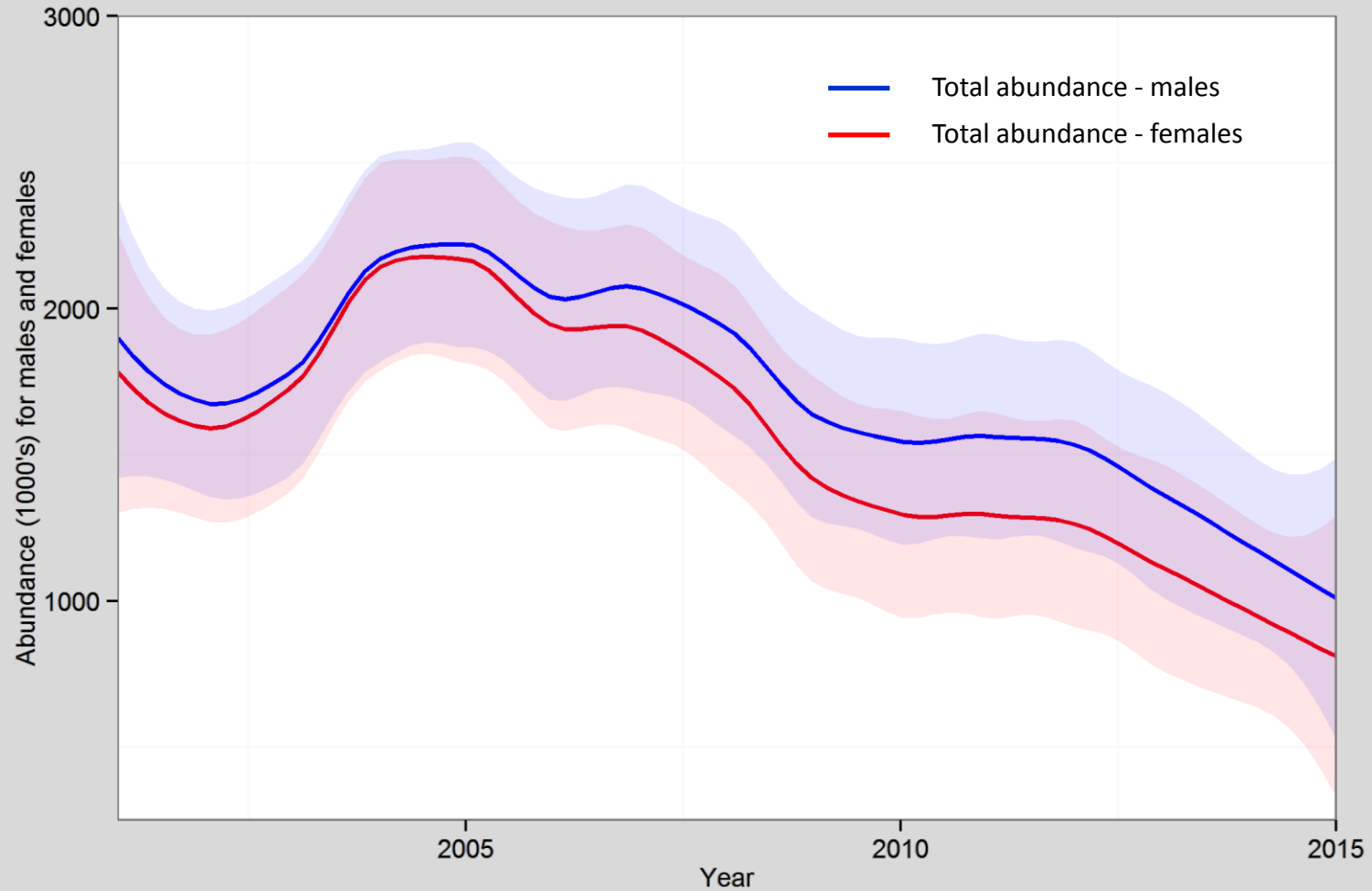


Chatham Strait sablefish: age-structured model



Informs in ways current assessment methods cannot

Example: Fishing at higher pressures than assumed for ABC





Chatham Strait sablefish



Comments on methodology

Input on other data

Suggestions

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