NOAA FISHERIES

SEDAR 57
Spiny Lobster

Review Workshop
Presentation 2
METHODS

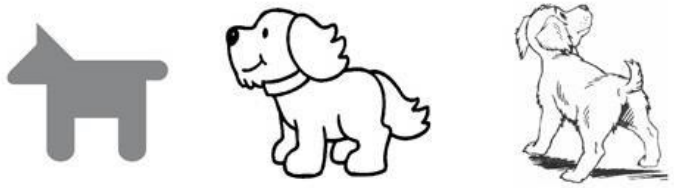
July 9-11, 2019

Review Workshop Presentation 3 - METHODS

1. Stock Synthesis
2. Model Configuration
3. Modeling Process
4. AW Research Recommendations

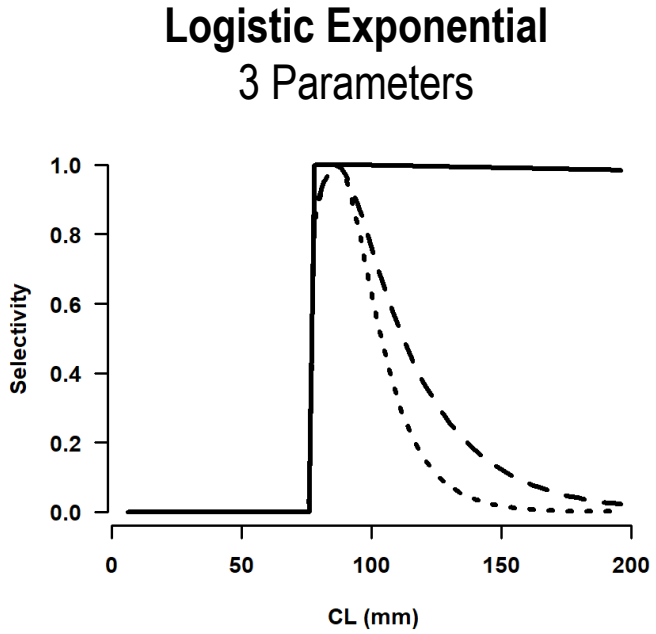
Stock Synthesis (SS) Version 3.30

- Integrated catch-at-age model (Methot and Wetzel 2013)
- Flexible in ability to use diversity of age, size, and aggregate data from fisheries and surveys
- SS simulates population dynamics of the stock and fisheries (mortality, selectivity, growth, etc.)



General Model Structure For All Three Island Platforms

- Age-structured model, age 0 to 15
- Two sexes, separate Von Bertalanffy growth
- One area model, single spawning population and associated stock-recruitment function
- No recruitment deviations
- Time-varying retention following implementation of 89 mm carapace length size limit
- Complete catch histories for two fishing fleets (Diving, Pots & Traps)
- Length-based selectivity estimated for primary fleets (Logistic Exponential)



Inputs to Models for Each of the Three Island Platforms

Data

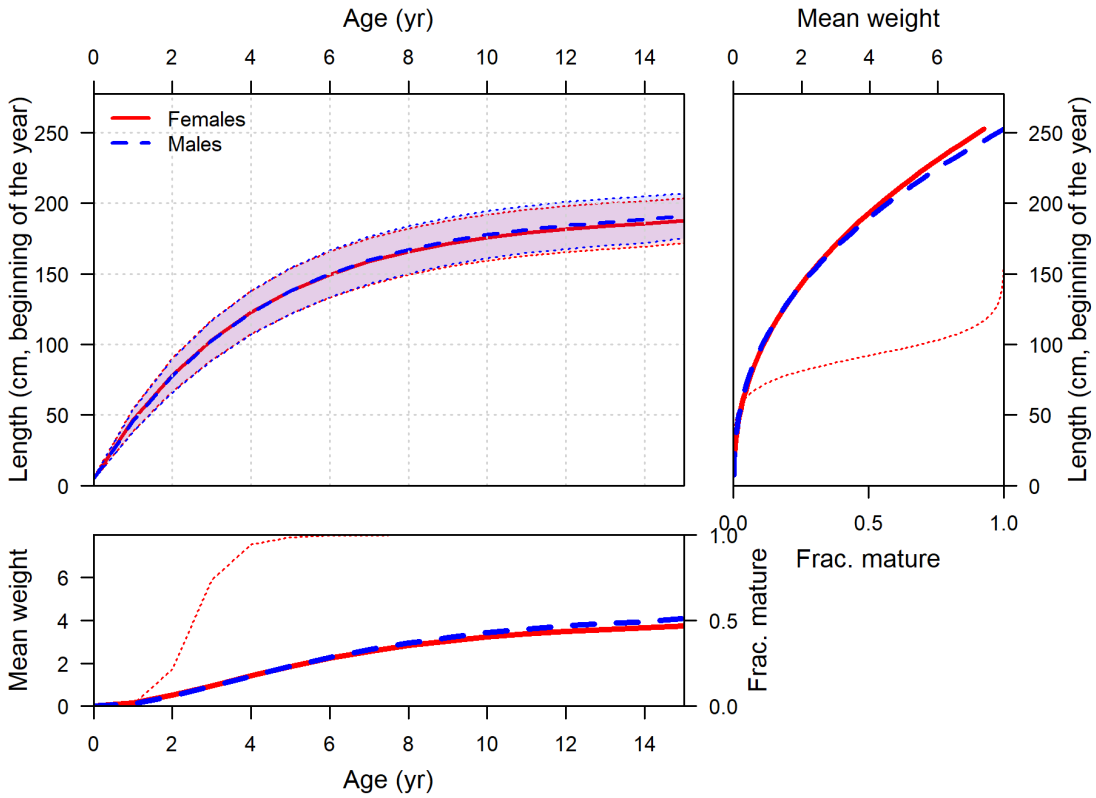
- Annual removals by Gear
- Annual length composition by Gear

Fixed Parameters

- Growth
- Natural Mortality
- Logistic Maturity
- Steepness
- 50/50 sex ratio
- Time block to represent change in retention due to size limit

Estimated Parameters

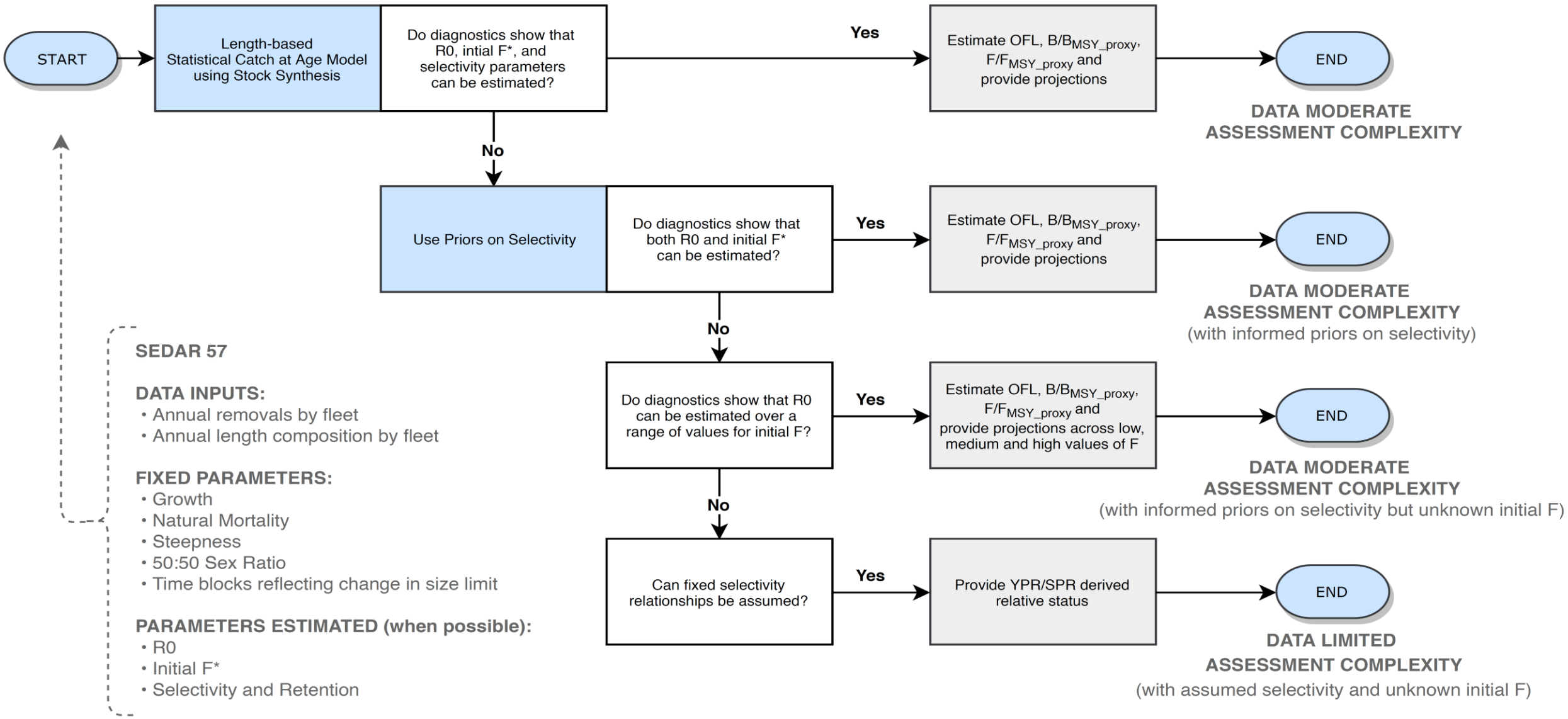
- R0
- Selectivity and Retention



Modeling Process

- Low complexity models were examined
- The model development process reflects constraints on model structure and interpretation of model outputs that are consistent with limitations of the available data
- The process provided a plan for either borrowing information or reducing complexity when data limitations resulted in non-convergence

Modeling Process Diagram



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DATA INPUTS:
- Annual removals by fleet
- Annual length composition by fleet

FIXED PARAMETERS:
- Growth
- Natural Mortality
- Steepness
- 50:50 Sex Ratio
- Time blocks reflecting change in size limit

PARAMETERS ESTIMATED (when possible):
- R0
- Initial F*
- Selectivity and Retention

*Initial F was assumed to be zero in STT and STX

AW Research Recommendations

- *Independently estimate availability/selectivity.*
- *Collect data on recreational landings.*
- *More basic biological studies* to improve understanding of key life history processes such as growth, length/age at maturity, fecundity, and their spatial variability.
- *Improve data on commercial landings and catch and effort*.

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