



# **C-5 CRAB PLAN TEAM REPORT AND FINAL NORTON SOUND RED KING CRAB ASSESSMENT**

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# CRAB PLAN TEAM REPORT: JANUARY 17-19, 2017

- NSRKC assessment: OFL and ABC
- AIGKC model recommendations
- Tanner crab model recommendations
- Update on BBRKC Gmacs
- Update on BSFRF survey
- *BBRKC PSC (D-1)*
- *Stock Prioritization (D-2)*



# BSAI Crab Stocks Management Timing

Norton Sound red king crab

Assessed in  
January/February

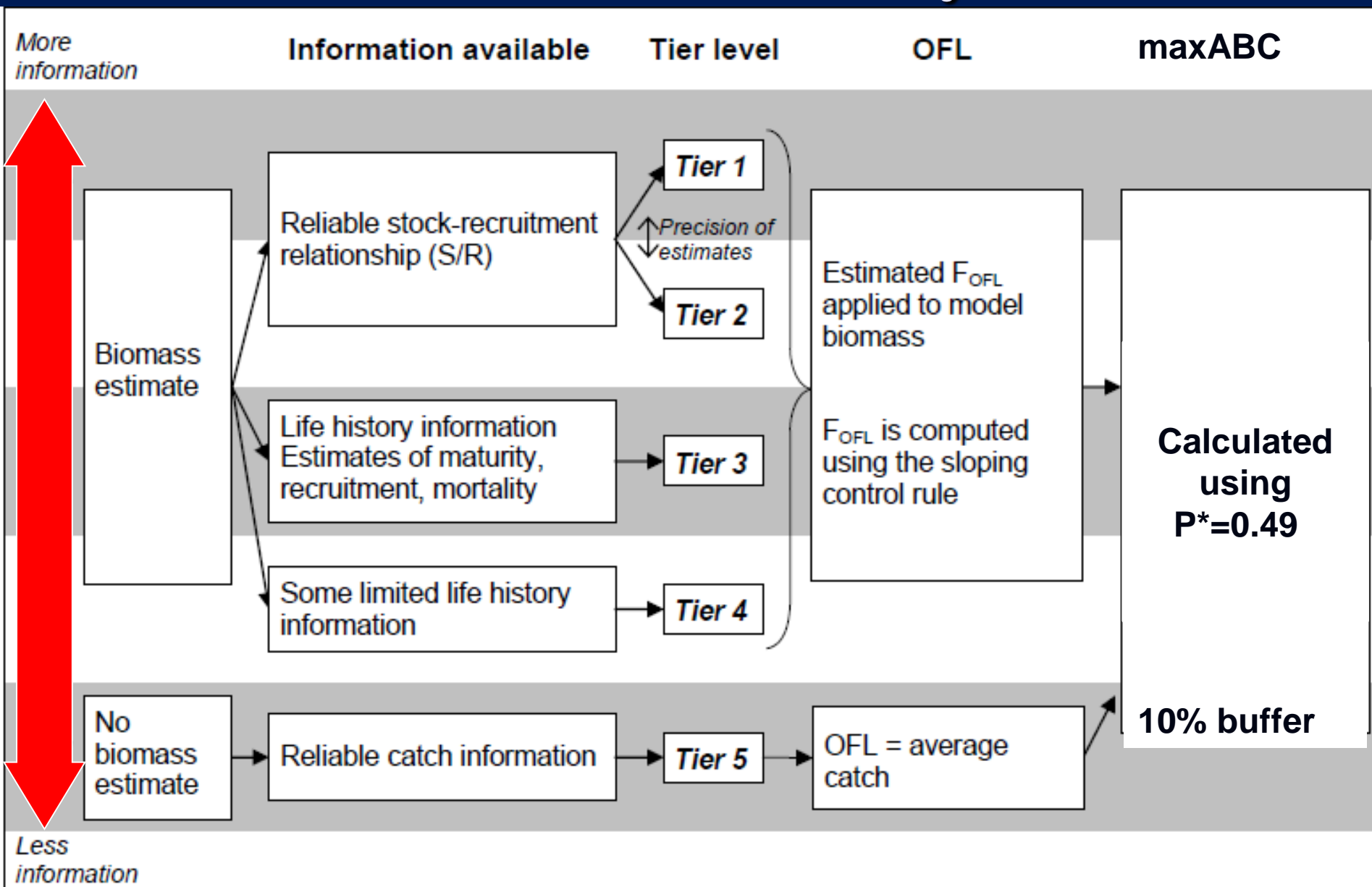
Aleutian Islands golden king crab  
Pribilof Islands golden king crab  
Western Aleutian Islands(Adak)  
red king crab

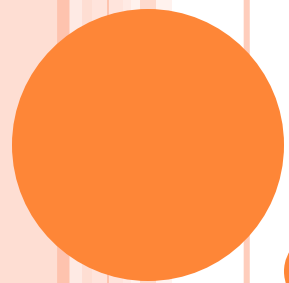
Assessed in  
May/June

EBS snow crab  
Bristol Bay red king crab  
Tanner crab  
Pribilof Islands red king crab  
Pribilof Islands blue king crab  
St. Matthew blue king crab

Assessed in  
September/  
October

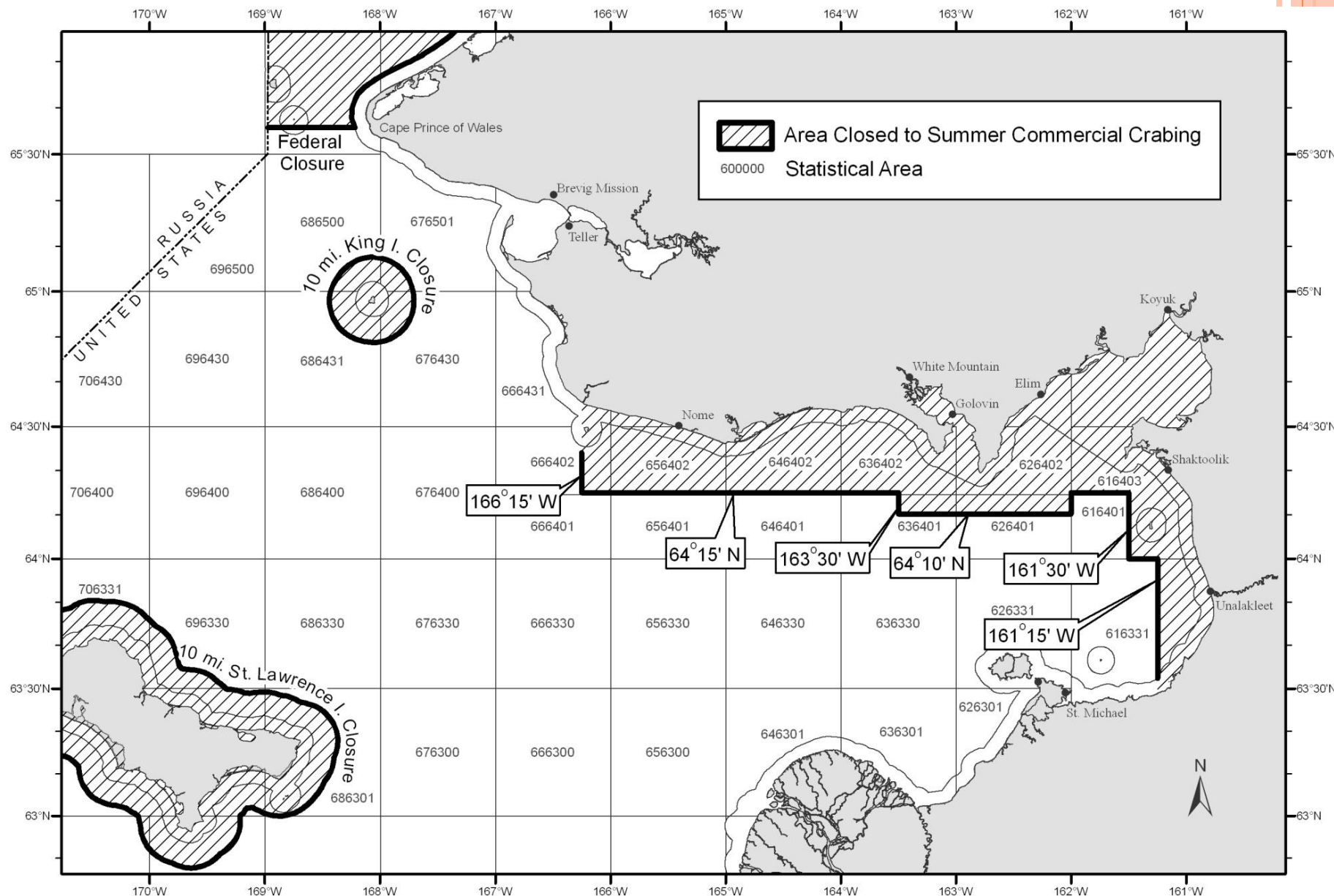
# Current Crab Tier system





# NORTON SOUND RED KING CRAB

# FISHERY DISTRICT



# CHARACTERISTICS OF NORTON SOUND RED KING CRAB

- Northernmost red king crab population that can support commercial fishery
- Live entire life-history in  $< 40\text{m}$  depth
- Many of life-history / stock separation unknown
- Commercial fishery started in 1977





# NORTON SOUND FISHERIES

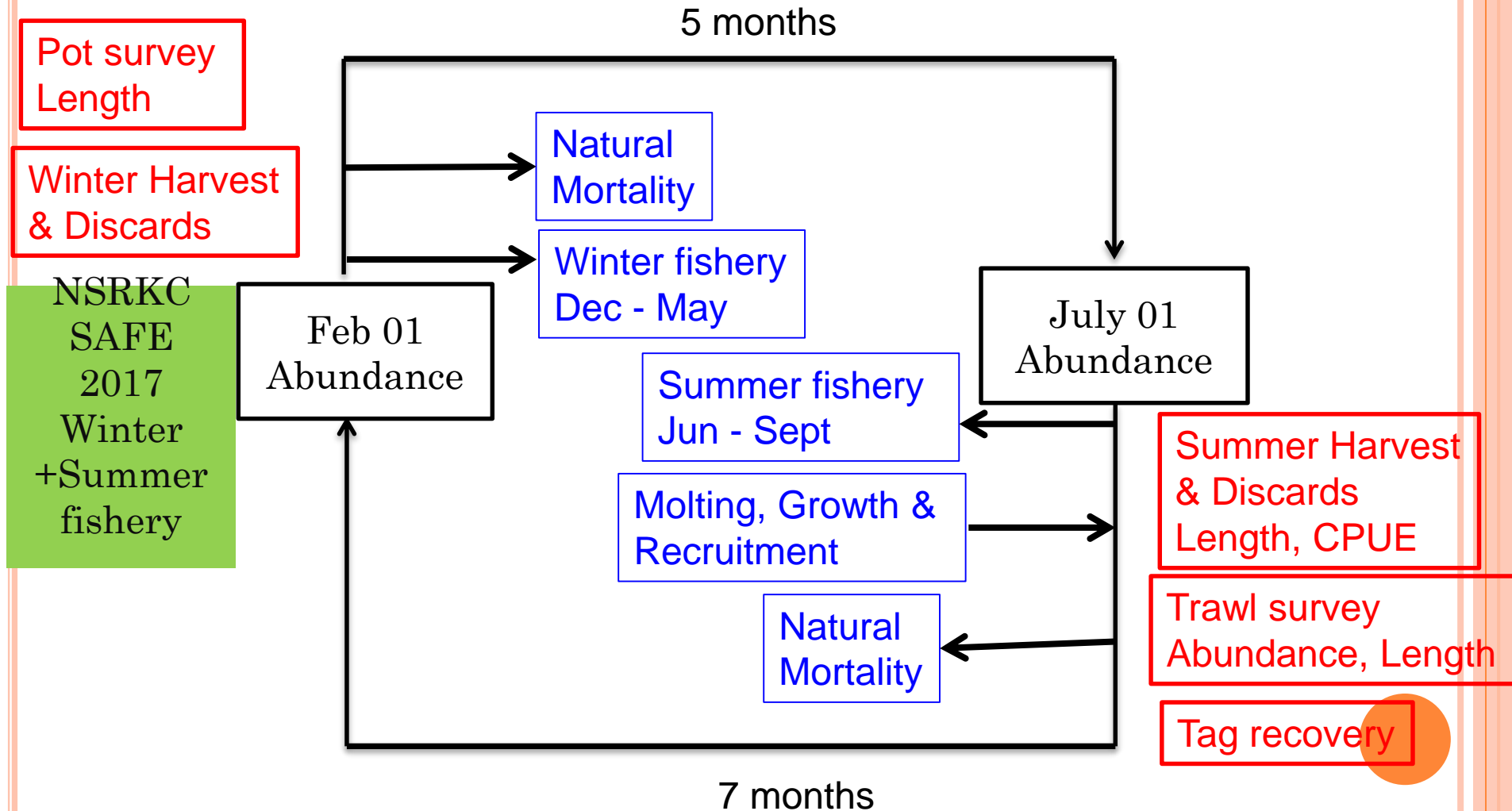
- Fisheries Periods:
  - Summer: July-August
  - Winter: December-April
- Summer Fisheries (majority of catch)
  - Commercial, CDQ, Subsistence
  - Small boat pots fishery
- Winter Fisheries:
  - Commercial, Subsistence
  - Pots through Ice
- Majority of harvest occurs in Summer Commercial Fisheries



# NSRKC STOCK ASSESSMENT MODEL

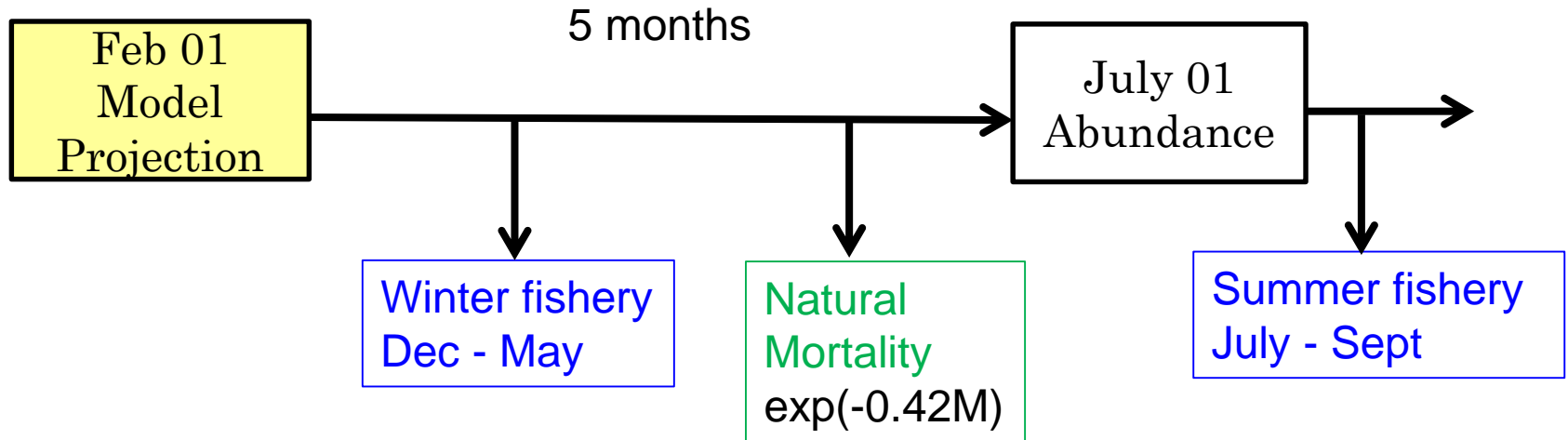
## MODELING PROCESS

### AVAILABLE DATA & MODEL FIT



# NSRKC STOCK ASSESSMENT MODEL

## OFL ISSUE

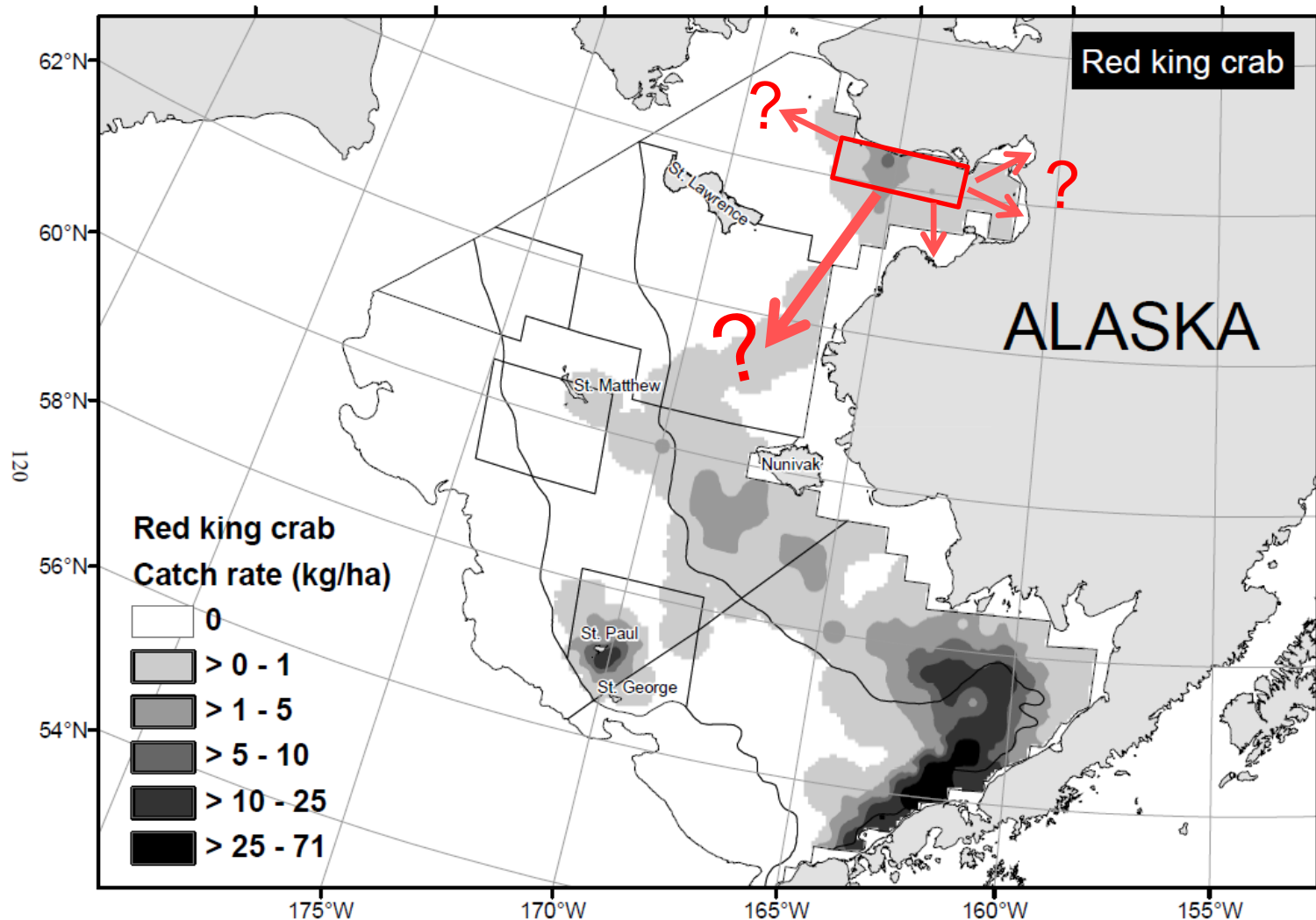


$$\text{OFL} = \text{Winter} + \text{Summer fishery}$$

How do we calculate B and OFL?  
Split OFL calculation



# ALTERNATIVE HYPOTHESES WITH RESPECT TO WHETHER OLDER CRABS DIE OR MIGRATE



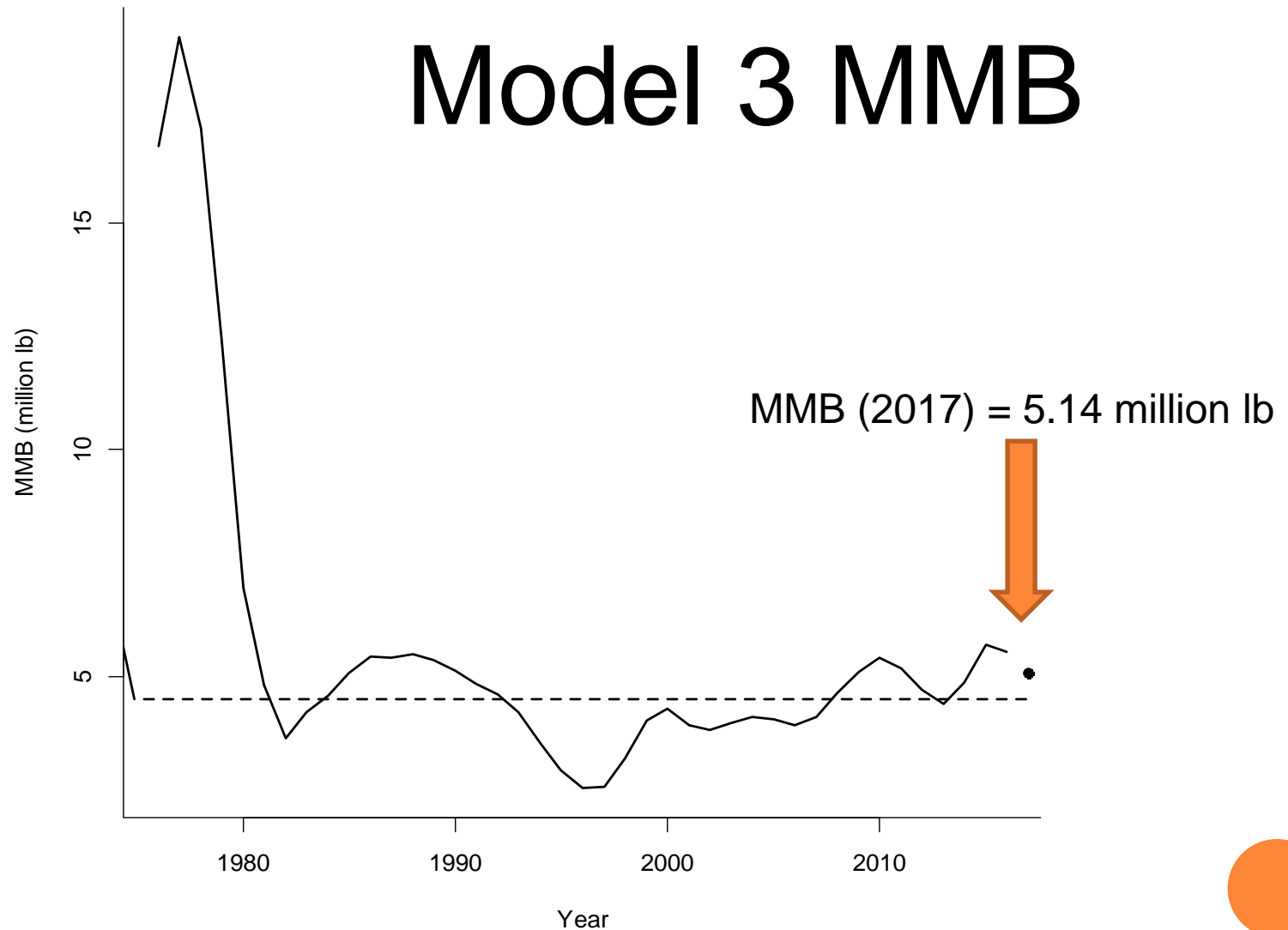
# FINAL MODEL SELECTION

- 3 alternative realities of Norton Sound Red King Crab life-history that are equally likely in terms of model fit but biologically unusual.
- 1. 3-4.0 times higher natural mortality for large sized crab (Models 0, 1, 3).
- 2. Large crabs (consisting of 50% of MMB) move out of Norton Sound fishery and survey area (Model 5).
- 3. 2.5 times higher natural mortality ( $M = 0.44$ ) for all crab lengths (Model 6).
- Author recommendation Model 3 (CPT concurred)
- Fewer parameters, better fit

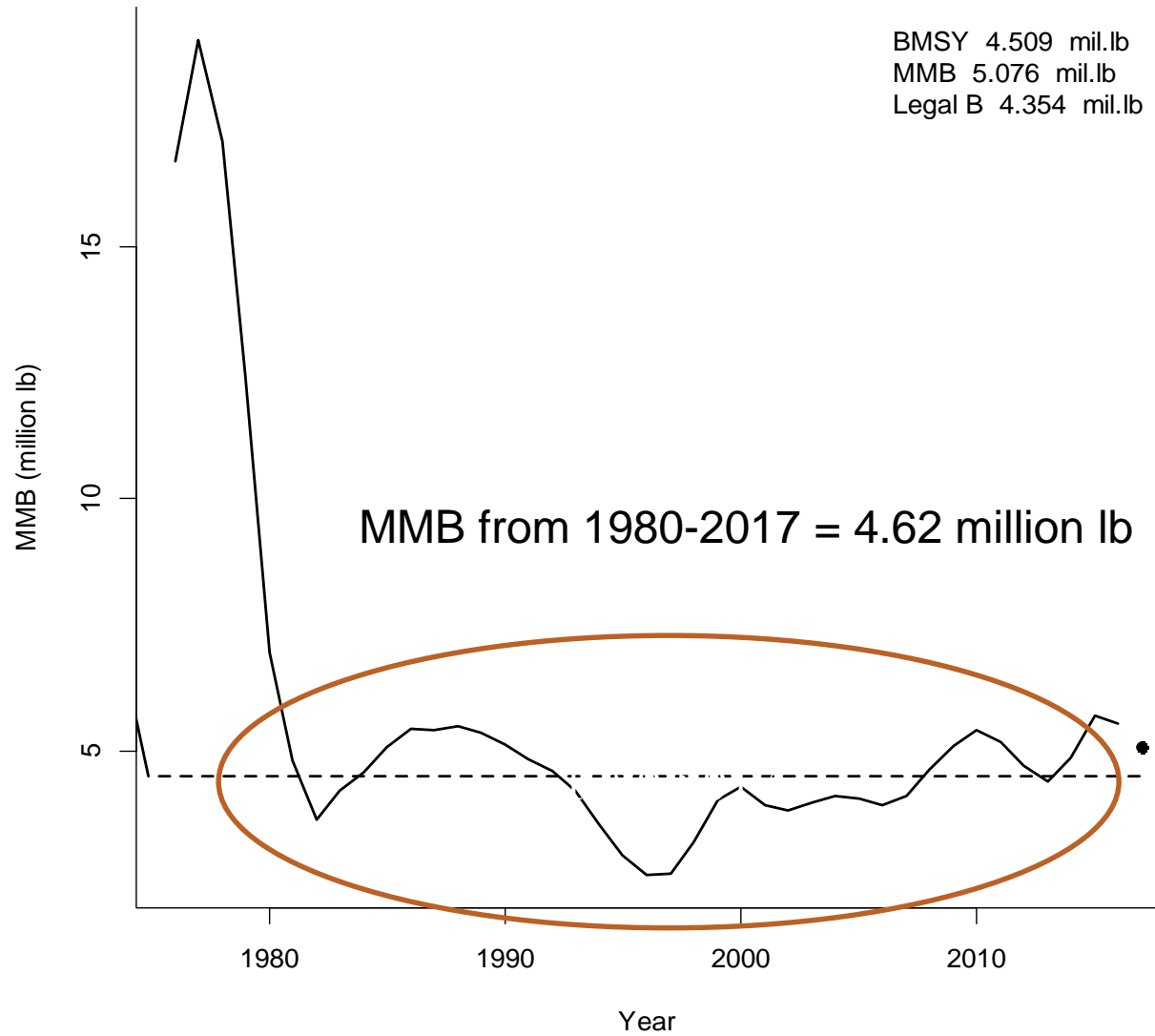


MMB Feb 01

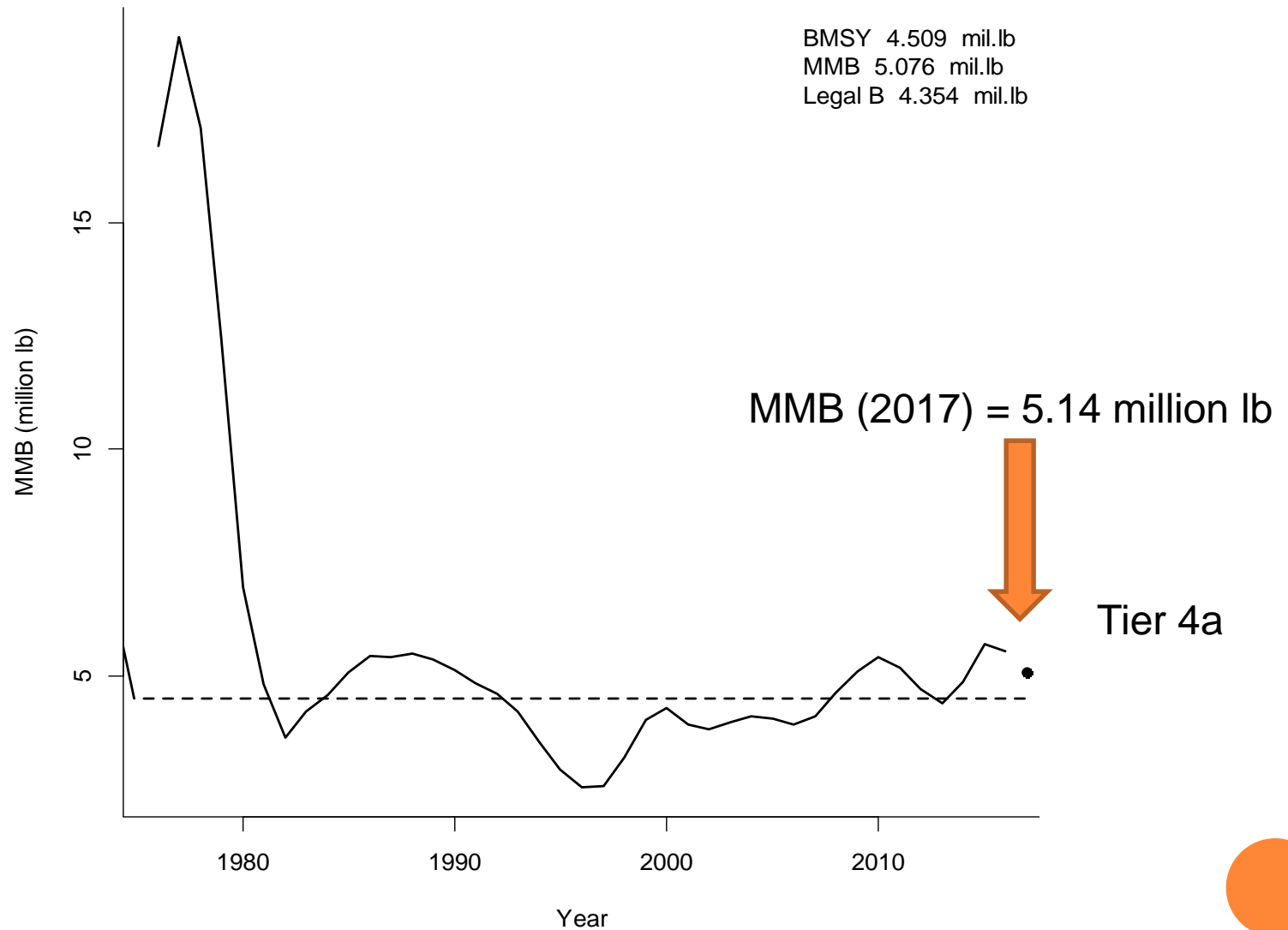
# Model 3 MMB



## MMB Feb 01



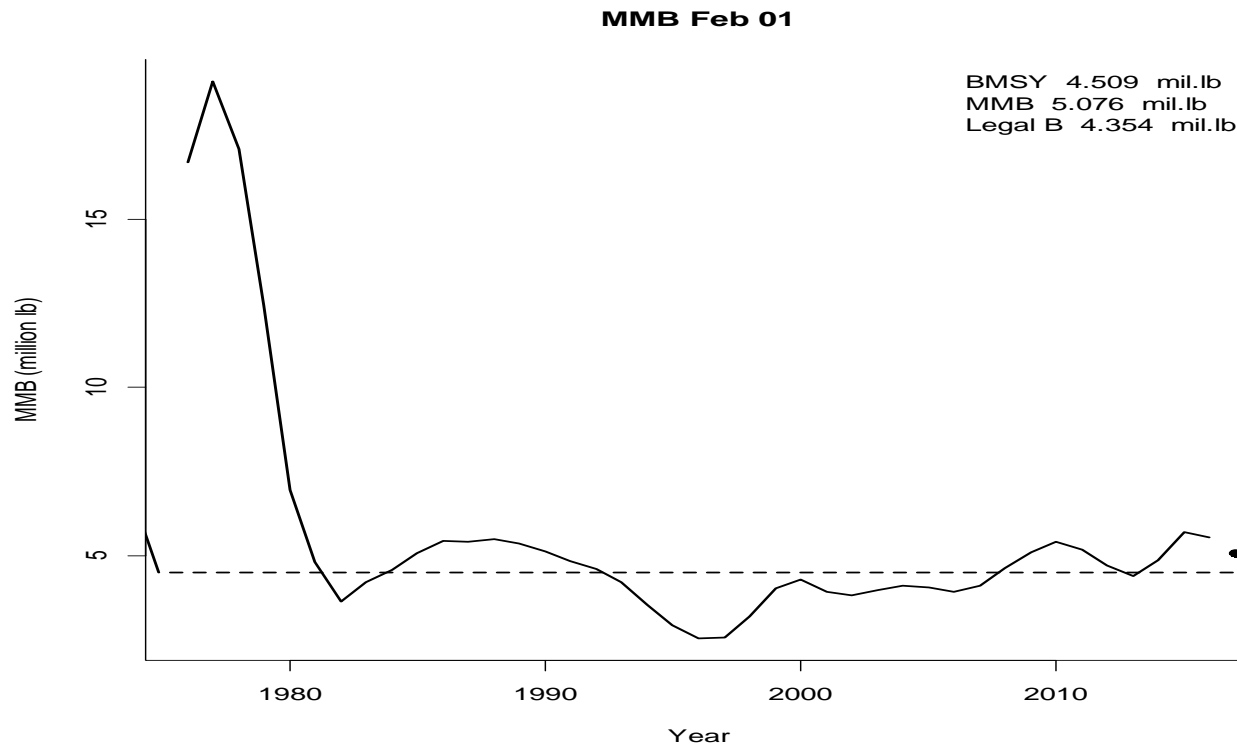
## MMB Feb 01





# OFL AND ABC

- $OFL_r = 0.67$  million lb
- $ABC = 20\% \text{ buffer} = 0.54 \text{ million lb} = 0.24 (1000t)$



# ADDITIONAL CPT ISSUES

- AIGKC model recommendations
- Tanner crab model recommendations
- Update on BBRKC Gmacs
- Update on BSFRF survey
- BBRKC PSC (D-1)
- Stock Prioritization (D-2)



# AIGKC MODEL RECOMMENDATIONS

- Model approved for use in 2017 specifications for June
- Discussion of model recommendations for May CPT and June SSC review
- CPT and SSC recommend that this stock qualifies for Tier 3 status for establishing OFL and ABC
  - $F_{35\%}$  can be estimated



# TANNER CRAB MODEL RECOMMENDATIONS

- Continued progress on a new Tanner crab model for use in 2017/18
- minor differences in old vs new model that author is working to tweak
- New model would be a bridge towards plans to move to a GMACs formulation in 2 years



# MAY MEETING AND FUTURE PLANS

- Final assessments for AIGKC, PIGKC, WAIRKC
- Modeling updates and proposed scenarios for
  - BBRKC (GMACs and 2016 model)
  - Snow crab
  - Tanner crab
  - SMBKC
  - PIRKC
- Research Priorities
- Revisit stock prioritization results and plans

