Evaluation of CMM 2017-01 for bigeye tuna

WCPFC-SC14-2018/MI-WP-08

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SC14, Busan, August 2018

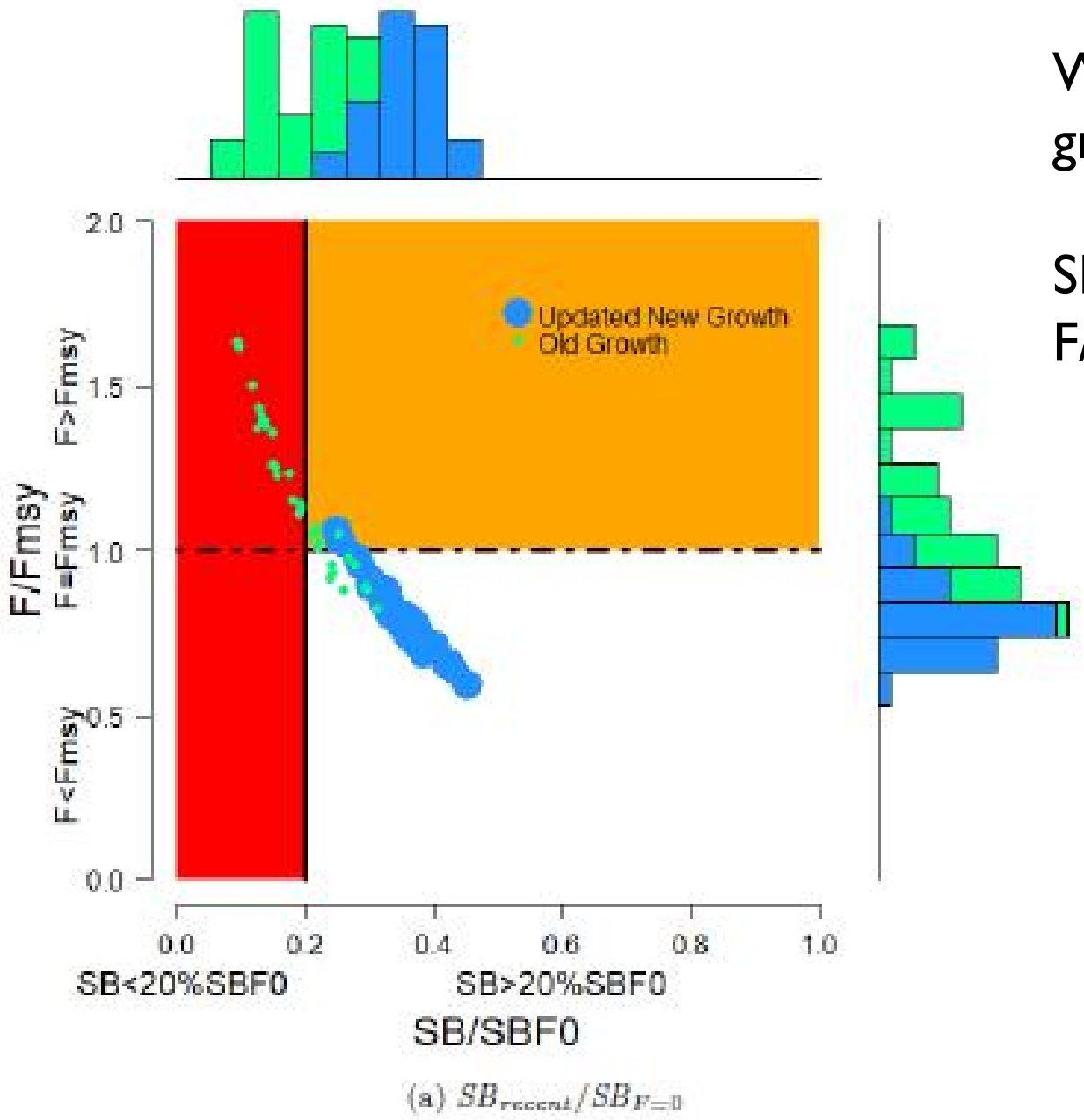
REQUEST

- WCPFC14-updated 2018 Harvest Strategy work plan requested that:
  - “SC and SPC provide advice to the Commission on the likely outcomes of the revised tropical tuna measure” (CMM 2017-01).
  - This request specifically referred to bigeye tuna.

OVERVIEW

- Updated BET assessment
- CMM 2017-01 evaluation
- Our approach
  - Quantifying options
  - Running projections
  - Key outcomes

2018 UPDATE ASSESSMENT



(a) $SB_{recent}/SB_{F=0}$

With SC13's weighting: 'new growth' 3 times more highly

$SB_{recent}/SB_{F=0}$ = 0.33, risk 15%

F/F_{msy} = 0.81, risk 22%

AIM OF THE CMM (BET)

- "Spawning biomass depletion ratio ($SB/SB_{F=0}$) is to be maintained at or above the average $SB/SB_{F=0}$ for 2012-2015." (para 12)

- How? Primarily:
  - Purse seine FAD closures in EEZs and HS
  - Flag-based longline bigeye catch limits
  - 'Relaxation' of measures compared to those in 2017

OVERVIEW

- Approach to evaluation
  - Quantifying what the CMM means for purse seine and longline fleets
  - Evaluating the long-term consequences for bigeye
- General approach similar to that for recent TT CMM evaluations
- ‘Flag’ level impact of Options
  - Due to flag exemptions, flag-based limits

CHALLENGES

- Assumption that overall PS effort will not increase dramatically
- Assume FAD closure period change has a proportional effect
- Assumption that high seas closure month choice has no effect
- Most exemptions not evaluated
- Longline flag-based catch levels are not specified for all.
- Similar to previous analyses, two scenarios examined:
  - 'optimistic' scenario
  - 'pessimistic' scenario
- Compare to 'status quo' (2013-15 levels)

‘OPTIMISTIC’ SCENARIO

- Purse seine:
  - Under 3 mth FAD closure in EEZ/HS:
    - Make an additional 1/8th more FAD sets relative to 2013-15 (when 4mth closure in place, i.e. 8mth FAD fishing);
  - Under additional 2mth HS FAD closure
    - Make 1/8th less HS FAD sets relative to 2013-15 (1mth extra closure)
- Longline:
  - limited longline CCMs take their entire 2017 catch limit, or 2013-15 if lower, others 2013-15 level.

‘PESSIMISTIC’ SCENARIO

- Purse seine:
  - Under 3 mth FAD closure in EEZ/HS:
    - Make an additional 1/8th more FAD sets relative to 2013-15 (when 4mth closure in place, i.e. 8mth FAD fishing);
  - Under additional 2mth HS FAD closure
    - Make 1/8th less HS FAD sets relative to 2013-15 (1mth extra closure)
    - But more FAD sets possible assuming HS effort limits used
- Longline:
  - limited longline CCMs take their entire 2017 catch limit/2000 mt limit, others 2013-15 level.
- Not as pessimistic as it could be.

	Non-SIDS		SIDS				
	3 mth FAD closure	Additional 2mth high seas removes:	3mth FAD closure	Additional 2mth high seas removes:	Non-SIDS	SIDS	Total
CHINA	1365	0			1365		1365
ECUADOR	285	8			277		277
EL SALVADOR	292	14			279		279
FSM			661	3		658	658
JAPAN	1019	0			1019		1019
KIRIBATI			963	0		963	963
MARSHALL ISLANDS			1285	7		1278	1278
NEW ZEALAND	110	2			107		107
PAPUA NEW GUINEA			1585	7		1578	1578
PHILIPPINES (distant-water)	464	0			464		464
REPUBLIC OF KOREA	1422	4			1418		1418
SOLOMON ISLANDS			128	0		128	128
EU (SPAIN)	477	29			449		449
CHINESE TAIPEI	2591	3			2588		2588
TUVALU			61	0		61	61
USA	3330	59			3271		3271
VANUATU			230	0		230	230
					11236	**4895**	**16131**

Scalar V 2013-15 avg

1.11

RESULTING SCALARS
(OFF 2013-15 AVG CONDITIONS)

Fishery	Status quo	Pessimistic	Optimistic
Purse seine	1	1.12	1.11
Longline	1	1.35	0.98

- Relaxing of Measure (~1 less FAD closure month, reversion to 2015/16 LL catch limits) generally leads to increased fishing relative to 2013-15 levels.

- For info: LL scalar with DWFN fleets taking limits, all others 2013-15 avg = 1.11

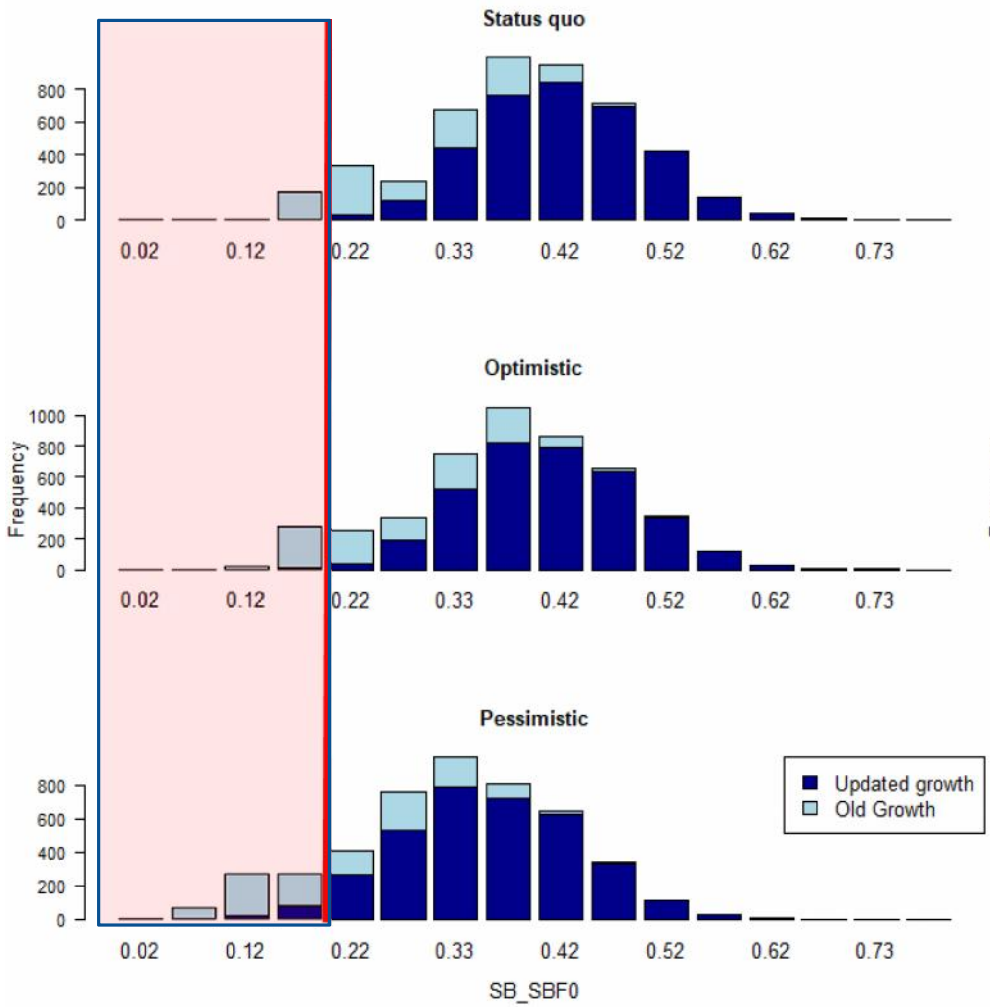
PROJECTION APPROACH

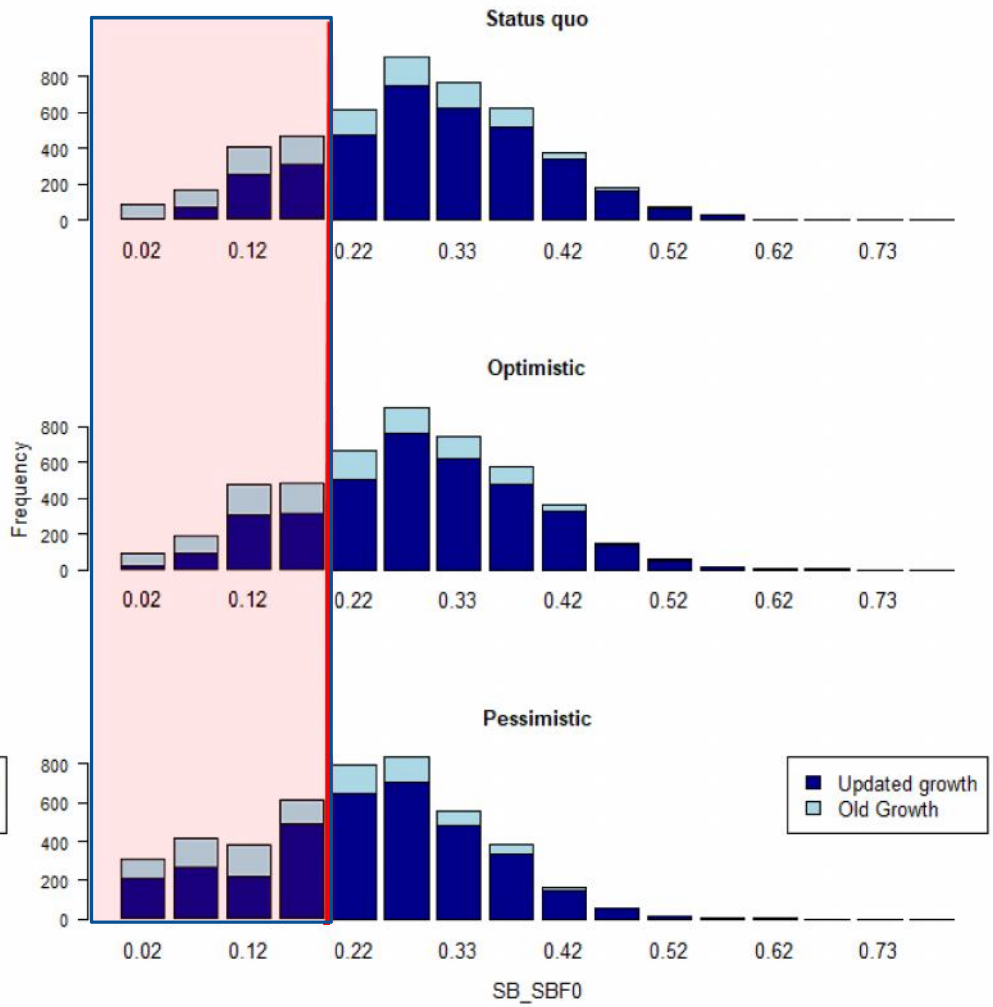
- Apply resulting scalars by gear (PS on effort, LL on catch)
- Project BET for 30 years from the 72 2018 'updated' assessment models
- Variability in future recruitment – 2 scenarios
  - recent 10 yr period (positive)
  - longer time period (less positive)
- Weighted average calculated (3:1 SC13 weighting)
- 'Moving window' calculation of $SB_{F=0}$

  i.e. $SB_{2045}/SB_{F=0,2035-2044}$

TERMINAL $SB/SB_{F=0}$

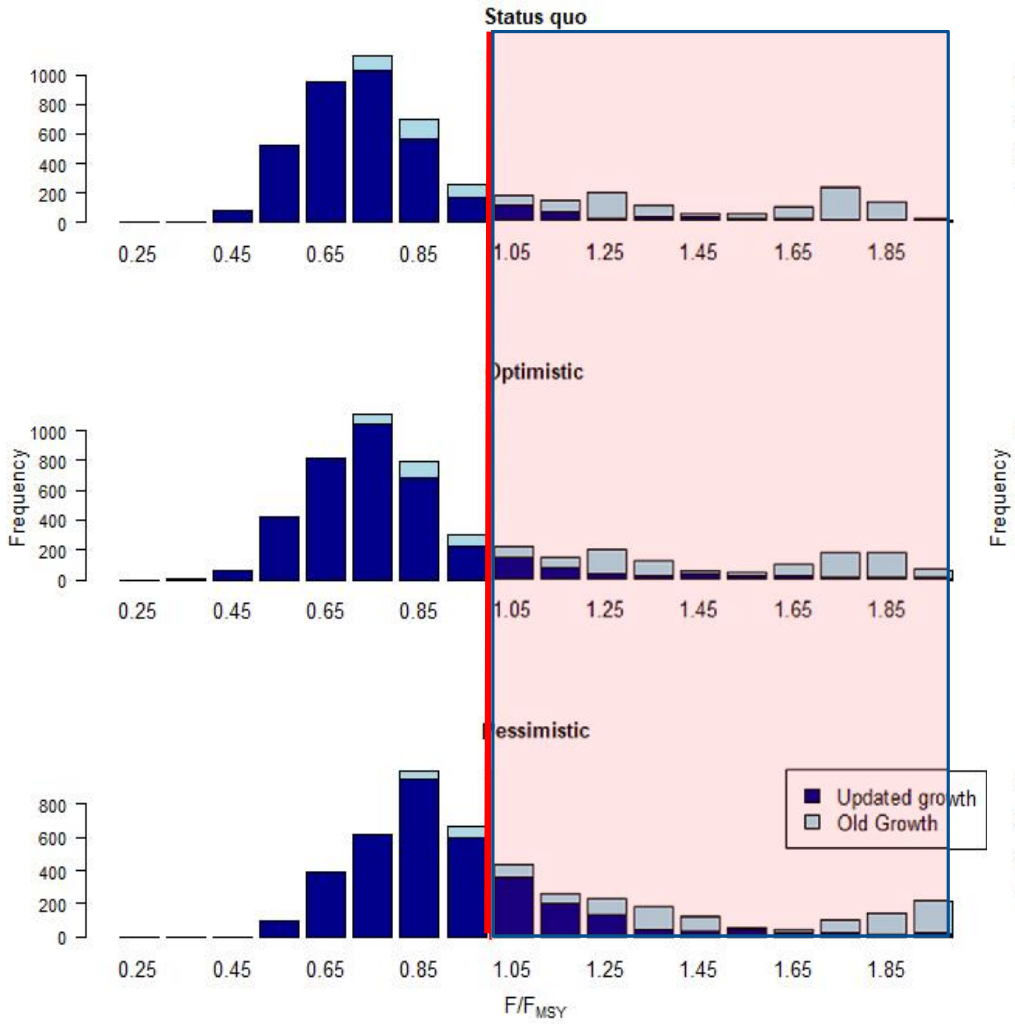
- Recent recruitment
- Long term recruitment

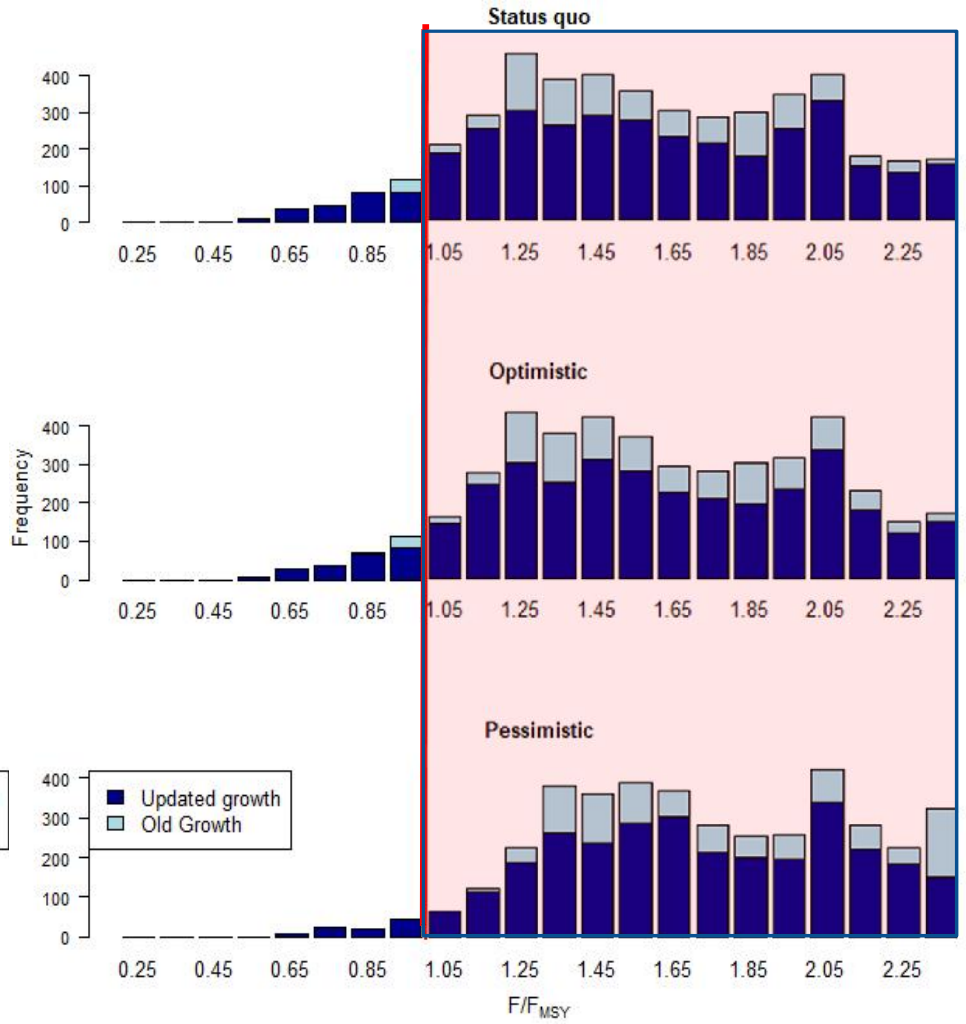




TERMINAL F/F_{MSY}

- Recent recruitment
- Long term recruitment





- Recent recruitments

Fishery	Assessment	Status quo	Optimistic	Pessimistic
Purse seine	-	1	0.64	1.02
Longline	-	1	0.80	1.08
Average $SB/SB_{F=0}$	0.33	0.40	0.39	0.34
$SB/SB_{F=0}$ relative to assessment	-	1.21	1.17	1.01
Risk SB_{2045} < LRP	15%	3%	5%	12%
Average F/F_{MSY}	0.81	0.78	0.80	0.95
F/F_{MSY} relative to assessment		0.96	0.99	1.17
Risk $F>F_{MSY}$	22%	24%	27%	43%

- Long-term recruitments

Fishery	Assessment	Status quo	Optimistic	Pessimistic
Purse seine	-	1	0.64	1.02
Longline	-	1	0.80	1.08
Average $SB/SB_{F=0}$	0.33	0.28	0.27	0.23
$SB/SB_{F=0}$ relative to assessment	-	0.85	0.82	0.69
Risk SB_{2045} < LRP	15%	24%	26%	40%
Average F/F_{MSY}	0.81	1.62	1.65	1.86
F/F_{MSY} relative to assessment		2.00	2.03	2.30
Risk $F>F_{MSY}$	22%	95%	95%	98%

SUMMARY

- Will the CMM achieve it's objectives?
  - Dependent on assumption of future recruitment
  - Recent positive recruitments – all scenarios (SB > SB_{recent}, F always < F_{MSY}, F <F_{recent} except 'pessimistic' scenario
  - Long term recruitment – no, under all scenarios. Risk SB<LRP greater than 20%, F>> F_{MSY}

  - All based on 2017 model grid weighting (3:1 'updated new' growth to old growth)

RECOMMENDATIONS

- We invite SC14 to:
  - Review the assumptions underlying this evaluation
  - [with any model reweighting required] provide advice to WCPFC15 on the potential long-term performance of CMM2017-01 for BET against stated CMM aims