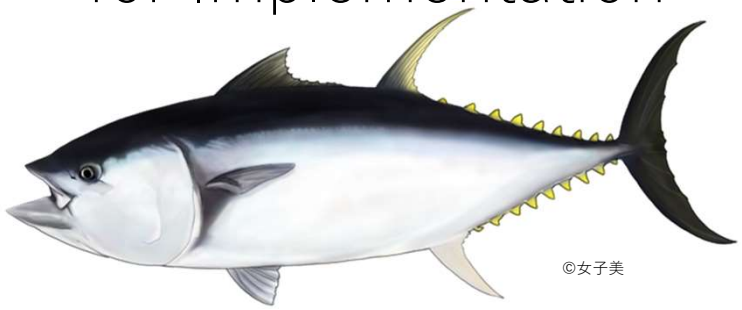
MSE Application to Pacific Bluefin Tuna: Requirements for Implementation



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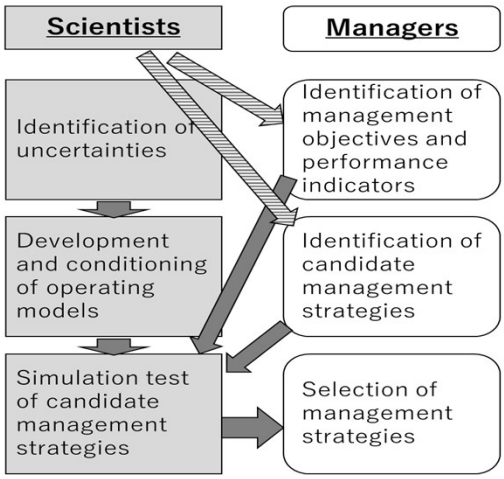
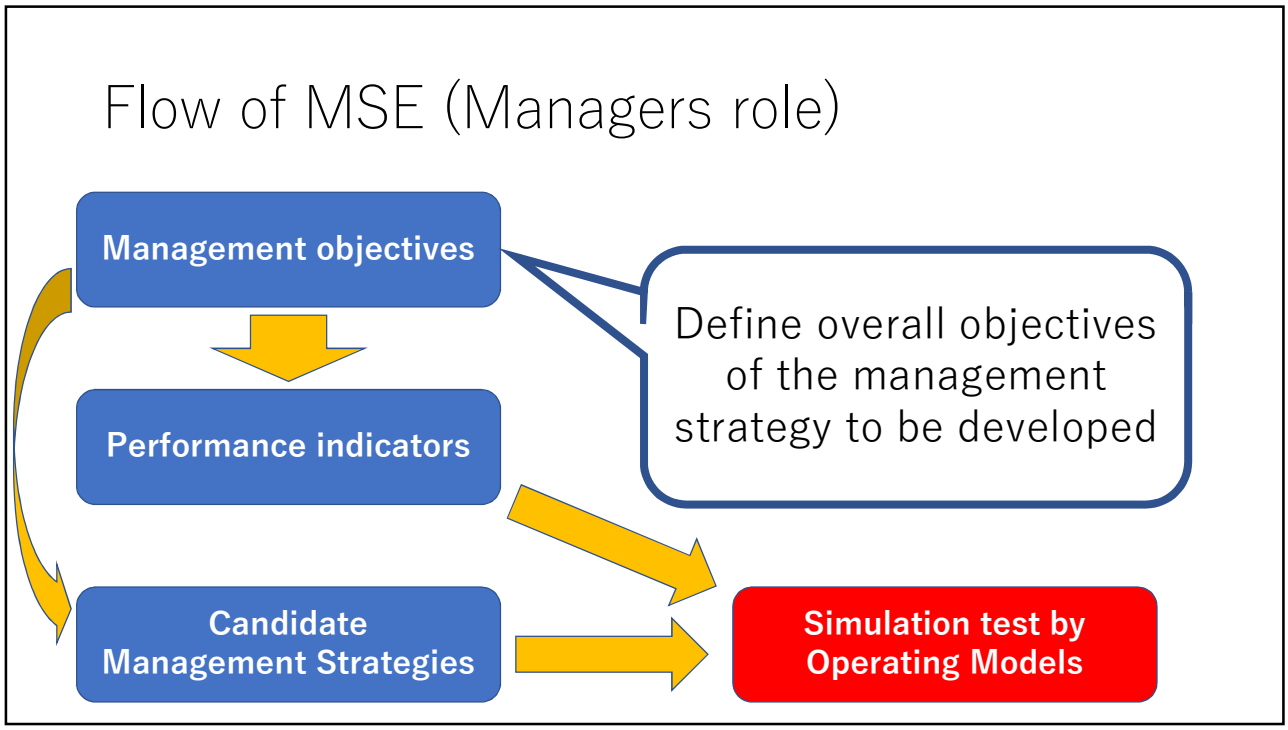
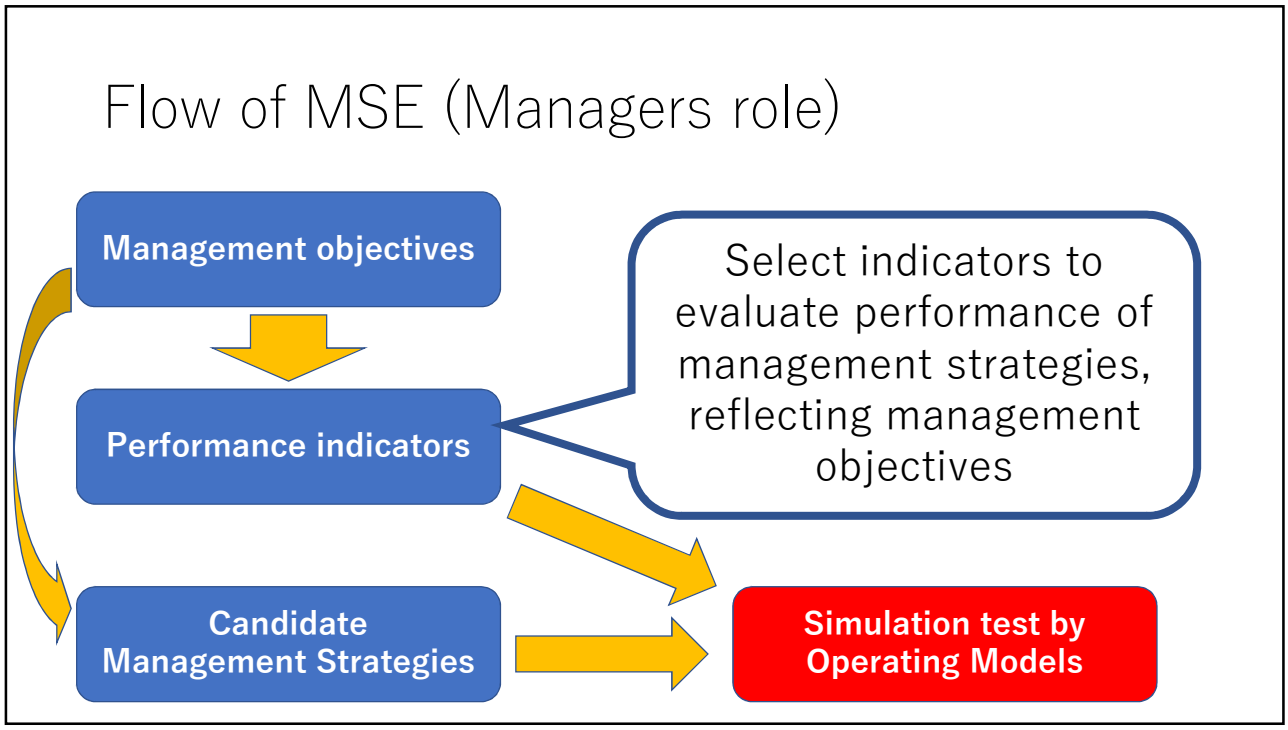
2019.05.20 @ISC 2nd PBFMSE Workshop

Flow of MSE

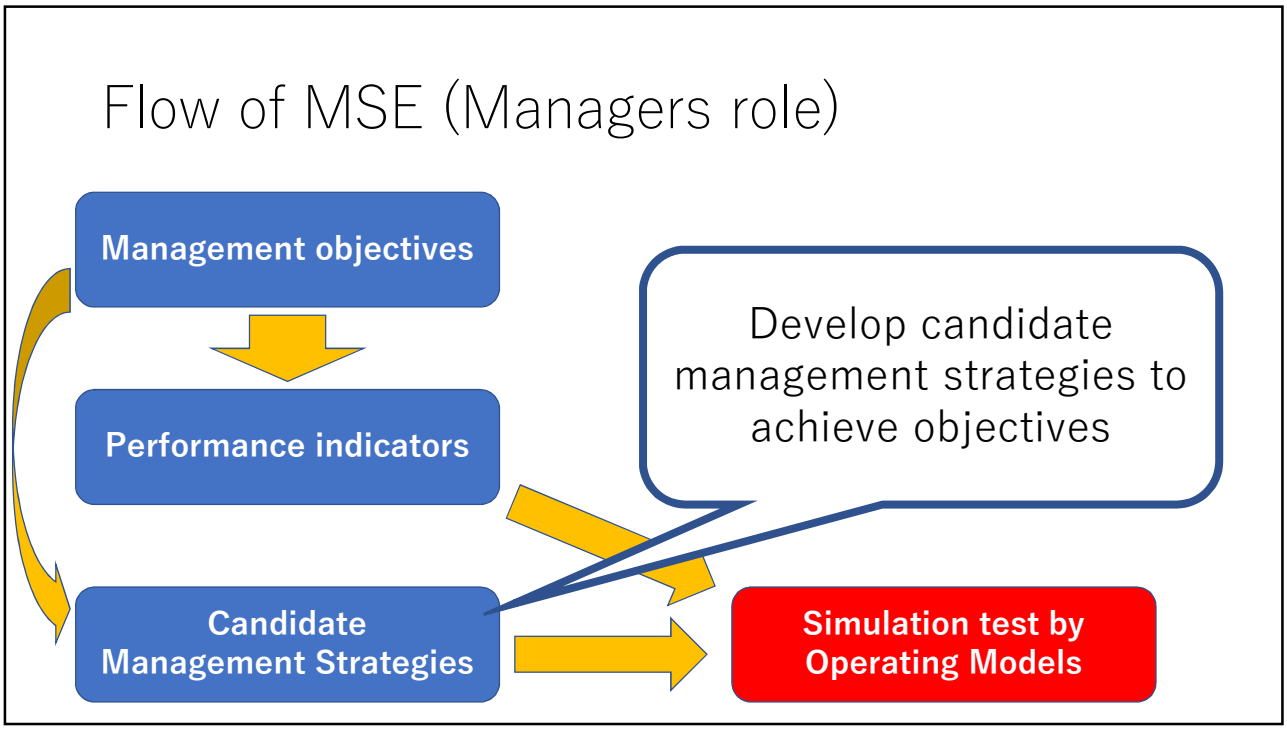
Best Practice MSE (Punt et al., 2016)




Flow of MSE (Managers role)
Management objectives
Performance indicators
Candidate Management Strategies
Simulation test by Operating Models
Define overall objectives of the management strategy to be developed


Flow of MSE (Managers role)
Management objectives
Performance indicators
Candidate Management Strategies
Simulation test by Operating Models
Select indicators to evaluate performance of management strategies, reflecting management objectives

Flow of MSE (Managers role)



Flow of MSE (Managers role)

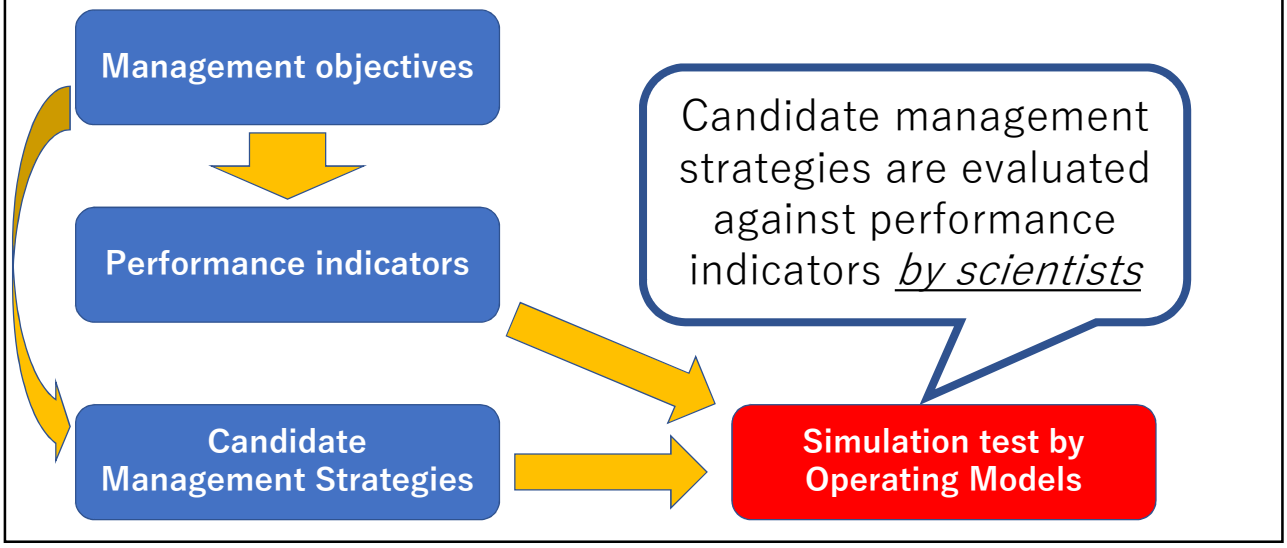


Table 4. Performance of Harvest Control Rules. Bmin, Bmean and Fmean are relative to MSY levels. Catch (Y1=short term, Y2=mid term and Y3=long term) in k tons. Probabilities in %. MAP, sd and maxTACc in k tons.

HCR			Stock Status					Safety		Catch							
Ftar	Bthresh	δTAC	Bmin	Bmean	Fmean	pGr%	pRed%	pBlim%	pBint%	Y1	Y2	Y3	MAP	sd			
0.60	0.60		0.65	2.02	0.51	93	0	100	5	23.17	21.14	28.24	1.20	4.82	2		
0.70	0.60		0.45	1.91	0.58	90	2	100	7	23.63	23.05	30.80	1.31	5.41	3		
0.80	0.60		0.28	1.76	0.65	83	3	100	10	24.25	24.80	32.49	1.42	5.78	3E+07	0	19.55	10.28
0.90	0.60		0.23	1.66	0.71	81	6	100	12	25.46	26.75	33.73	1.53	5.83	3E+07	0	20.21	10.76
1.00	0.60		0.12	1.44	0.87	66	13	98	19	25.45	28.68	34.54	1.67	6.26	4E+07	0	21.00	11.74
0.60	0.80		0.63	2.04	0.51	93	0	100	5	23.16	21.06	28.34	1.21	4.88	2E+07	0	19.90	8.71
0.70	0.80		0.41	1.88	0.59	88	2	100	7	23.54	22.97	30.79	1.31	5.41	3E+07	0	19.62	9.59
0.80	0.80	20%	0.34	1.76	0.62	86	3	100	9	24.30	24.49	32.32	1.42	5.74	3E+07	0	19.95	10.25
0.90	0.80		0.23	1.65	0.70	78	6	99	14	24.81	26.22	33.42	1.51	6.13	4E+07	0	20.88	10.75
1.00	0.80		0.19	1.58	0.76	72	9	99	16	25.33	27.15	34.77	1.66	6.40	4E+07	0	21.21	11.60
0.60	1.00		0.62	2.02	0.51	92	1	100	6	23.17	20.61	28.31	1.22	5.01	3E+07	0	20.00	8.74
0.70	1.00		0.47	1.95	0.56	92	1	100	6	23.36	21.95	31.10	1.37	5.74	3E+07	0	20.48	9.78
0.80	1.00		0.37	1.81	0.61	83	2	100	11	23.93	22.62	32.56	1.49	6.34	4E+07	0	20.76	10.67
0.90	1.00		0.25	1.70	0.68	79	5	100	13	24.44	23.62	34.34	1.61	7.05	5E+07	0	21.14	11.51
1.00	1.00		0.19	1.62	0.73	76	7	99	13	24.46	24.46	35.26	1.69	7.10	5E+07	0	21.41	11.92
0.60	0.60		0.58	2.03	0.51	92	0	100	6	21.46	21.14	29.06	1.40	5.61	3E+07	0	20.74	10.09
0.70	0.60		0.40	1.86	0.59	89	2	100	7	22.27	23.25	30.99	1.51	5.95	4E+07	0	20.38	10.84
0.80	0.60		0.25	1.74	0.67	80	4	100	11	23.10	25.03	32.71	1.65	6.34	4E+07	0	20.93	11.88
0.90	0.60		0.17	1.52	0.76	73	8	99	14	24.14	27.08	33.90	1.78	6.38	4E+07	0	21.34	12.73
1.00	0.60		0.14	1.47	0.82	69	12	98	18	24.99	28.79	33.99	1.92	6.73	5E+07	0	22.22	13.20
0.60	0.80		0.60	2.04	0.50	93	1	100	6	21.67	20.87	29.12	1.38	5.55	3E+07	0	20.67	10.00
0.70	0.80		0.40	1.87	0.59	88	2	100	8	22.07	22.99	31.09	1.52	6.10	4E+07	0	20.93	11.00
0.80	0.80	25%	0.19	1.72	0.68	82	4	100	10	23.10	24.60	33.11	1.70	6.72	5E+07	0	21.53	12.18
0.90	0.80		0.18	1.60	0.74	77	7	99	14	23.42	26.09	34.25	1.79	7.00	5E+07	0	21.34	12.61
1.00	0.80		0.17	1.61	0.78	70	11	98	16	24.56	27.34	34.59	1.96	7.13	5E+07	0	22.59	13.75
0.60	1.00		0.57	2.01	0.50	93	0	100	6	21.63	20.30	29.24	1.44	5.89	3E+07	0	21.19	10.24
0.70	1.00		0.39	1.90	0.58	88	2	100	8	21.94	21.61	31.27	1.57	6.48	4E+07	0	21.45	11.36
0.80	1.00		0.30	1.81	0.62	84	3	100	9	22.62	22.78	33.37	1.75	7.26	5E+07	0	21.81	12.59
0.90	1.00		0.23	1.72	0.68	80	5	99	11	23.58	23.52	34.87	1.88	7.61	6E+07	0	22.10	13.26
1.00	1.00		0.17	1.63	0.74	74	8	99	15	23.33	24.56	35.48	1.99	7.91	6E+07	0	22.69	13.98
0.60	0.60		0.51	2.01	0.52	91	1	100	7	21.00	21.09	29.33	1.51	6.09	4E+07	0	21.24	11.29
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0.90	0.60		0.17	1.59	0.73	73	8	99	14	24.25	27.17	33.56	2.04	7.18	5E+07	0	22.48	14.51
1.00	0.60		0.16	1.52	0.82	68	13	97	18	24.90	28.53	33.68	2.08	7.08	5E+07	0	22.86	14.70
0.60	0.80		0.53	2.01	0.51	91	0	100	5	20.70	21.00	29.12	1.51	6.16	4E+07	0	21.48	11.45
0.70	0.80		0.37	1.89	0.57	85	2	100	11	21.71	22.51	31.15	1.70	6.74	5E+07	0	21.48	12.43
0.80	0.80	30%	0.23	1.75	0.66	83	4	100	9	22.67	24.40	32.78	1.89	7.01	5E+07	0	22.19	13.57
0.90	0.80		0.19	1.63	0.73	77	7	99	14	23.75	25.65	33.96	2.02	7.85	6E+07	0	22.21	14.50
1.00	0.80		0.13	1.51	0.81	69	11	98	18	23.39	27.10	34.56	2.20	8.01	6E+07	0	23.45	15.50
0.60	1.00		0.56	2.07	0.51	94	1	100	5	21.08	19.94	29.15	1.52	6.16	4E+07	0	21.40	11.14
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0.80	1.00		0.28	1.81	0.62	81	3	100	10	22.09	22.68	33.41	1.93	7.92	6E+07	0	22.41	13.99
0.90	1.00		0.19	1.70	0.70	78	6	99	12	22.47	23.69	34.35	2.09	8.41	7E+07	0	23.14	15.07
1.00	1.00		0.19	1.67	0.73	74	8	99	14	22.35	24.28	34.74	2.24	8.56	7E+07	0	23.43	15.65

Flow of

Example of results

Management

Performance

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Management

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Flow of MSE (Managers role)

Management objectives

Performance indicators

Candidate
Management Strategies

Simulation test by
Operating Models

MSE is iterative process!!

Purpose of this Workshop

- WCPFC and IATTC requested ISC to start MSE of Pacific bluefin tuna in 2019 and complete it by 2024.
- In order to conduct MSE, certain inputs and decisions by managers and stakeholders are necessary.
- The purpose of this workshop is **to continue** discussions on those elements.
- The discussion will continue as MSE goes on.

Something to note

- Management measures are already in place to achieve rebuilding targets based on the results of stock assessment.
- PBF stock is slowly recovering. 2016 recruitment is above average and 2017 and 2018 recruitment are apparently at, at least, similar level.
- Indices are monitored annually to detect “unexpected”.
- Assessment is conducted (at least) once in two years.
- MSE requires additional personnel and will stretch ISC resources.

Let’s move into details..