

Provisional results of 1st round of MSE and proposed work plan for North Pacific Albacore



**NOAA
FISHERIES**

Southwest
Fisheries Science
Center



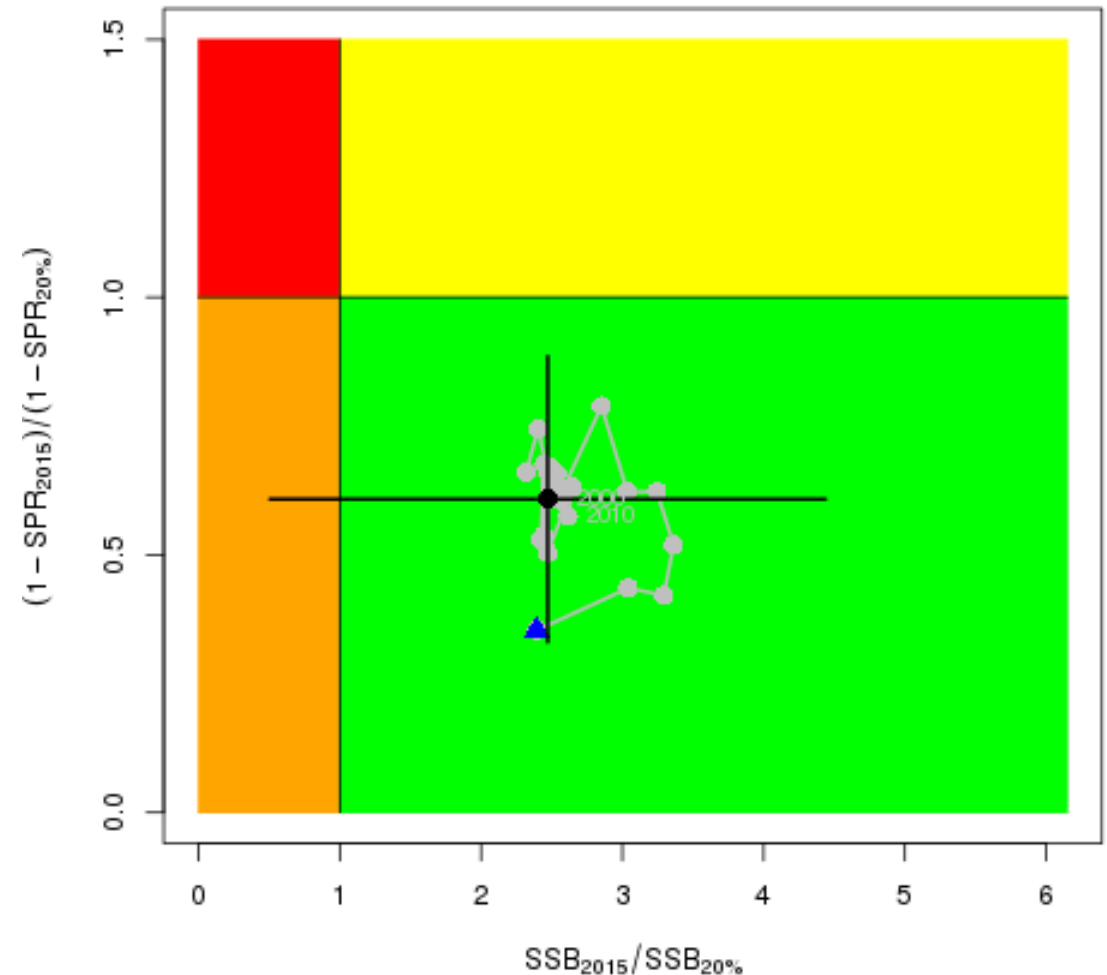
Steven Teo
Fisheries Resources Division
Southwest Fisheries Science Center

Pacific Fishery Management Council Meeting
San Diego
23 June 2019



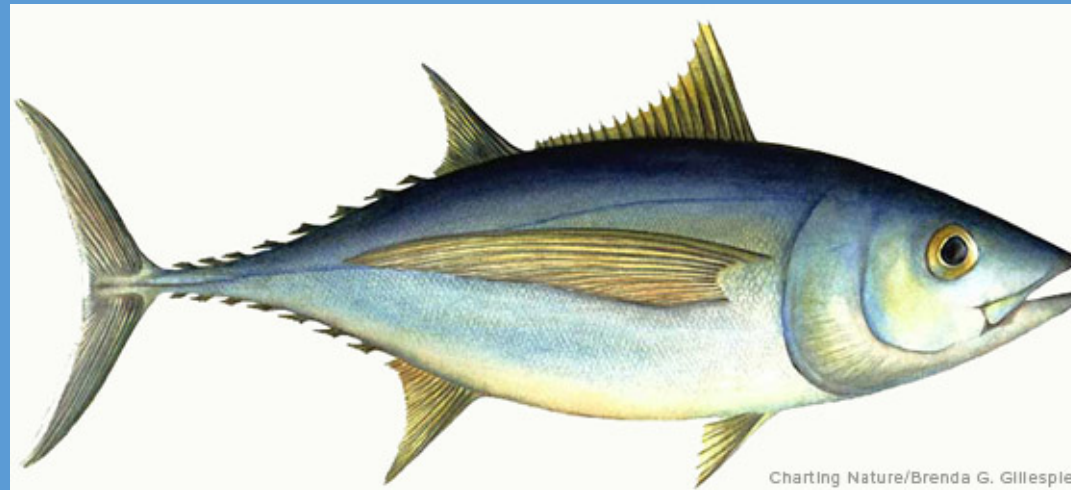
Current Stock Status of North Pacific Albacore

- Last assessment was in 2017 by ISC Albacore Working Group
- Not in overfished condition
 $SSB_{2015}/0.2SSB_{current,F=0} > 1$
- 2015 female SSB at about 47% of unfished female SSB
- Not experiencing overfishing
 $F_{2012-2014}/F_{20\%} < 1$
- $F_{2012-2014}$ at about $F_{50\%}$



North Pacific Albacore MSE

Collaborative international effort to examine performance of **alternative harvest strategies** and associated **reference points** for North Pacific albacore given **uncertainty**



Charting Nature/Brenda G. Gillespie



What is Management Strategy Evaluation?



- MSE is a process to evaluate the **trade offs** and **performance of candidate management strategies** under a range of **scenarios** and **uncertainties** using computer simulations
- Flight simulator for fisheries management but with a lot more uncertainty
- If a management strategy does not perform adequately in a computer simulation, we should not expect it to work in the real world
- Difference between forward projections and MSE is that MSE uses a feedback loop



Prior MSE Workshops for NP Albacore

1st ISC MSE WS (16-17 April 2015 at Yokohama, JAPAN)

- **71 participants:** fishery managers, stakeholders, NGOs, and scientists
- **Purpose:** to learn about and understand the MSE process; review the objectives, benefits, and requirements to implement an MSE; as well as recent progress made by tuna RFMOs towards adopting and implementing the MSE process

2nd ISC MSE WS (24-25 May 2016 at Yokohama, JAPAN)

- **24 participants:** fishery managers, stakeholders, NGOs, and scientists
- **Purpose:** to develop management objectives and performance indicators, based on input from managers, stakeholders and scientists

3rd ISC MSE WS (17-19 October 2017 at Vancouver, CANADA)

- **23 participants:** fishery managers, stakeholders, NGOs, and scientists
- **Purpose:** to identify acceptable level of risk for each management objective; and develop candidate reference points and harvest control rules for testing

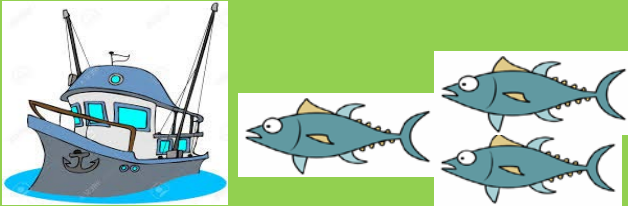
4th MSE Workshop for North Pacific Albacore

- MSE workshop in Yokohama, Japan (Mar 5 – 7, 2019)
- Managers, NGOs, scientists & stakeholders
- Canada, Chinese-Taipei, Japan, USA & WCPFC
- Examine preliminary results from 1st round of MSE
- Feedback from managers & stakeholders on improvements
- Recommendations
 - ~~NPALB management proposals~~
 - 2nd round of MSE
 - Presentation of MSE results
 - Management objectives
 - Candidate harvest strategies, reference points, & control rules



Management Objectives for North Pacific Albacore

MANAGEMENT OBJECTIVES



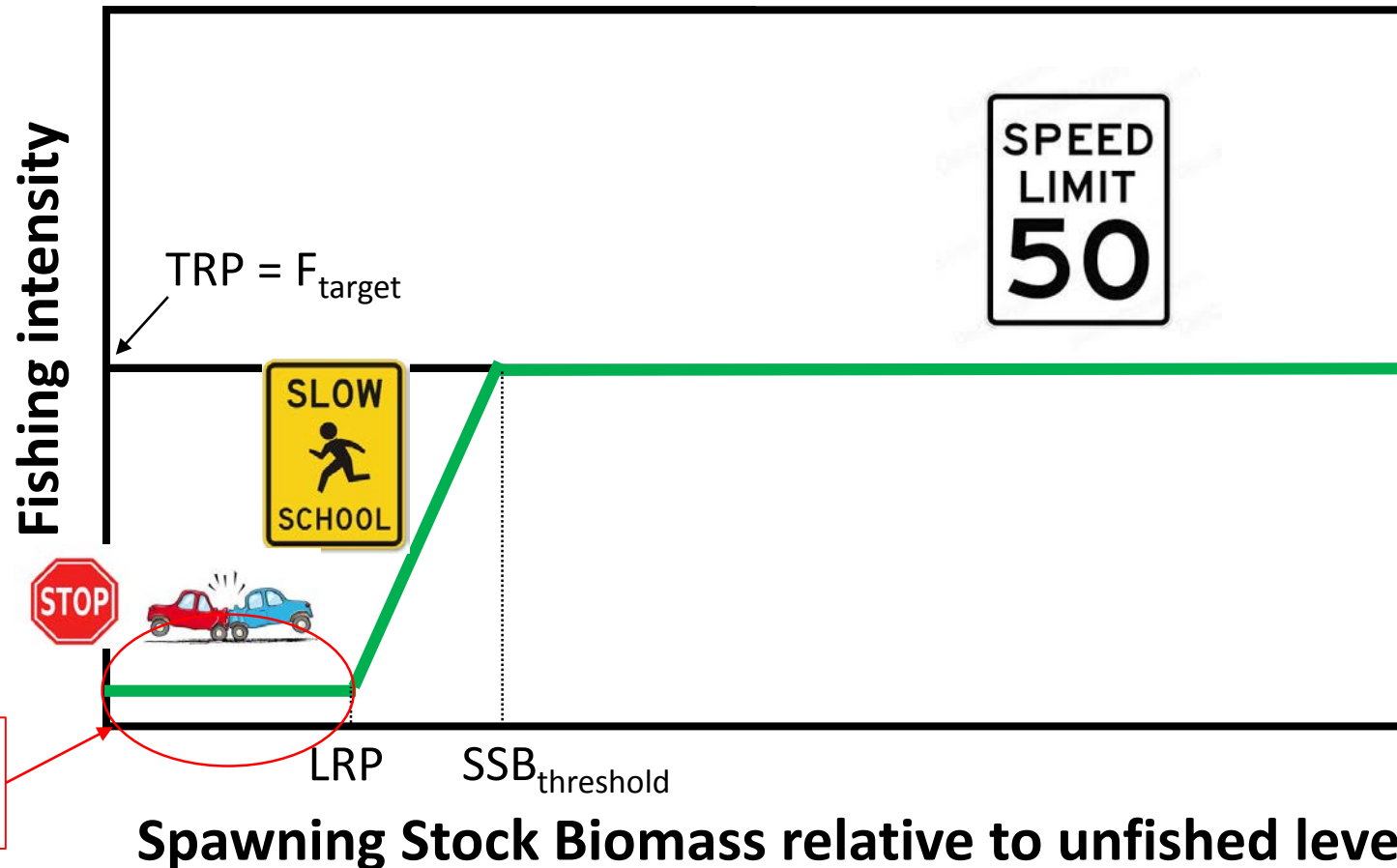
1. Have infrequent management intervention
2. Maintain biomass
3. Maintain equitable share of catch among different fisheries
4. Maintain catch
5. Have stability in catch
6. Fish at the target level set by management

MANAGEMENT OBJECTIVES

1. *Maintain SSB above the limit reference point (LRP)*
2. *Maintain depletion of total biomass around historical average depletion*
3. *Maintain harvest ratios by fishery at historical (2006-2015) average*
4. *Maintain catches above average historical catch*
5. *Change in total allowable catch between years should be relatively gradual*
6. *Maintain fishing intensity (F) at the target value with reasonable variability*

Harvest Control Rules Tested in NPALB MSE

Example HCR for Harvest Strategy 3 (HS3)



For initial MSE,
 $F=0$ when $SSB < SSB_{\text{limit}}$

Total of 11 different Harvest Control Rules for HS1 and HS3

Harvest strategy	Output control	Harvest control rule	Ftgt	SSBthr	SSBlim
1 or 3	TAC or TAE	1	F50	30%SSB	20%SSB
1 or 3	TAC or TAE	4	F50	20%SSB	14%SSB
1 or 3	TAC or TAE	6	F50	14%SSB	7.7%SSB
1 or 3	TAC or TAE	7	F40	30%SSB	20%SSB
1 or 3	TAC or TAE	10	F40	20%SSB	14%SSB
1 or 3	TAC or TAE	12	F40	14%SSB	7.7%SSB
1 or 3	TAC or TAE	13	F30	20%SSB	14%SSB
1 or 3	TAC or TAE	15	F30	14%SSB	7.7%SSB
1 or 3	TAE	16	F0204	30%SSB	20%SSB
1 or 3	TAE	17	F0204	20%SSB	14%SSB
1 or 3	TAE	18	F0204	14%SSB	7.7%SSB

Conclusions

1. A lower fishing intensity TRP (i.e. F50), maintains the population at a higher level than F40 and F30, requiring less management intervention and resulting in lower catch variability between years. However, lower fishing intensity results in lower overall catch.
2. HCRs with a TRP of F40 have less closures and higher catch stability as compared to a TRP of F30, resulting in comparable or higher catch despite lower fishing intensity.
3. An LRP and threshold reference point closer to the TRP results in a higher frequency of management interventions, fishery closures and lower catch stability.
4. HS3 showed lower catch stability than HS1, but had less fishery closures.
5. Harvest strategies with Total Allowable Effort (TAE) control performed better than ones with Total Allowable Catch (TAC) control across all performance metrics.

Limitations of 1st Round of MSE

- Effort not explicitly modeled, but implicitly via a fishing intensity
- TAE control may be more effective in the simulation than in the real world and is assumed to be implemented as effectively as TAC control
- TAE/TAC control can be effectively achieved for all fleets – targeting and not targeting
- TAE/TAC is always achievable – no limits on fleet capacity
- Allocation constant to 1999-2015 average

Limitations of 1st Round of MSE

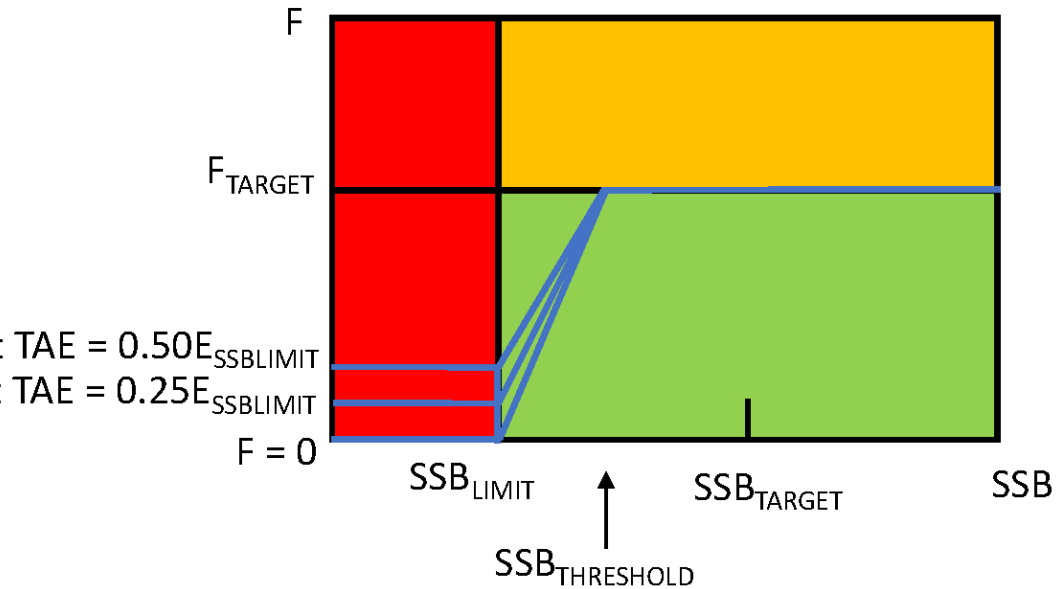
- Only one rebuilding plan (fishery is closed) was tested
- When determining stock status, only the probability of SSB being higher than the LRP or threshold reference point at a 50% level was tested
- Movement processes are not explicitly modeled
- Simulations are conditioned on data from 1993 onwards. Therefore, they may not include the full range of uncertainty in the population dynamics of NPALB going back to the 1960's.

Main Recommendations: 4th MSE Workshop (Yokohama)

- No management recommendations for WCPFC and IATTC
- Results from 2nd round of MSE to be presented at 5th MSE Workshop in late 2020 – early 2021
- Smaller, more focused list of RPs and HCRs
- Stricter risk level (80 or 90%) used to evaluate risk of breaching candidate LRPs
- Evaluate 2 candidate levels of control if LRP breached
- Evaluate option where fleets not under control if $SSB \geq SSB_{\text{THRESHOLD}}$
- Use historical (1997 – 2015) fishing intensity or mortality levels to represent available fishing effort

Candidate Harvest Control Rules for 2nd MSE round

Harvest Strategy 3



Mixed control is TAE for Japan pole-and-line and EPO surface, and TAC for all other fleets

	Control-type	F_{TARGET}	$B_{THRESHOLD}$	B_{LIMIT}
1	TAE, TAC, Mixed	$F_{50\%}$	30%SSB	20%SSB
2	TAE, TAC, Mixed	$F_{50\%}$	30%SSB	14%SSB
3	TAE, TAC, Mixed	$F_{50\%}$	30%SSB	7.7%SSB
4	TAE, TAC, Mixed	$F_{50\%}$	20%SSB	14%SSB
5	TAE, TAC, Mixed	$F_{50\%}$	20%SSB	7.7%SSB
6	TAE, TAC, Mixed	$F_{40\%}$	20%SSB	14%SSB
7	TAE, TAC, Mixed	$F_{40\%}$	20%SSB	7.7%SSB
8	TAE, TAC, Mixed	$F_{40\%}$	14%SSB	7.7%SSB

Potential Future Fishery Effort Scenarios

- Increased effort & catches in the north Pacific – new entrant to fishery but catch is known to the assessment and under HCR – ramp in catch of 2,400 t per year up to 50,000 t
- Increased effort & catches in the north Pacific – new entrant to fishery but catch is not known to the assessment and is not under HCR – ramp in catch of 2,400 t per year up to 50,000 t

Proposed Workplan for ISC ALBWG

Dates	Task/Event
13 - 17 May 2019	Preliminary 1 st round of MSE results presented to IATTC Science Advisory Committee
11 - 15 Jul 2019	ISC Plenary reviews 1 st round of MSE results
August 2019	1 st round of MSE results presented to WCPFC Scientific Committee
2 - 6 Sep 2019	1 st round of MSE results presented to WCPFC NC
12 - 18 Nov 2019	Data preparation for NPALB stock assessment (Shimizu, Japan)
16 - 23 March 2020	Next NPALB stock assessment (La Jolla, USA)
Late 2020 - early 2021	5 th ISC MSE workshop to examine results of 2 nd round of MSE (location to be determined)

Role of Pacific Fishery Management Council in NPALB MSE

- MSE workshops are not decision-making bodies
- Primary decision making bodies are IATTC & WCPFC NC
- Continue supporting participation of HMSMT, HMSAS, & Council staff at MSE workshops
- Provide feedback to WCRO & PIRO
- Based on MSE results and in collaboration with US managers and delegations, develop and propose reference points and harvest control rules for consideration by WCPFC NC & IATTC

Questions?