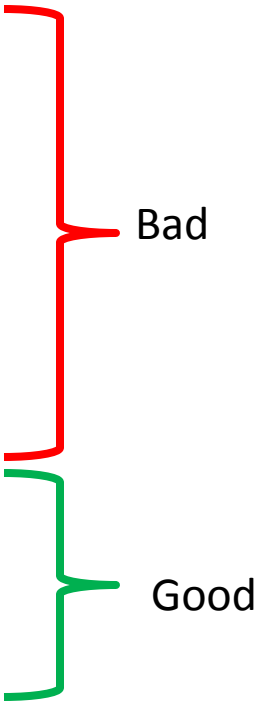
APPLICATION OF HARVEST CONTROL RULES FOR TROPICAL TUNAS IN THE EASTERN PACIFIC OCEAN

Operational HCR

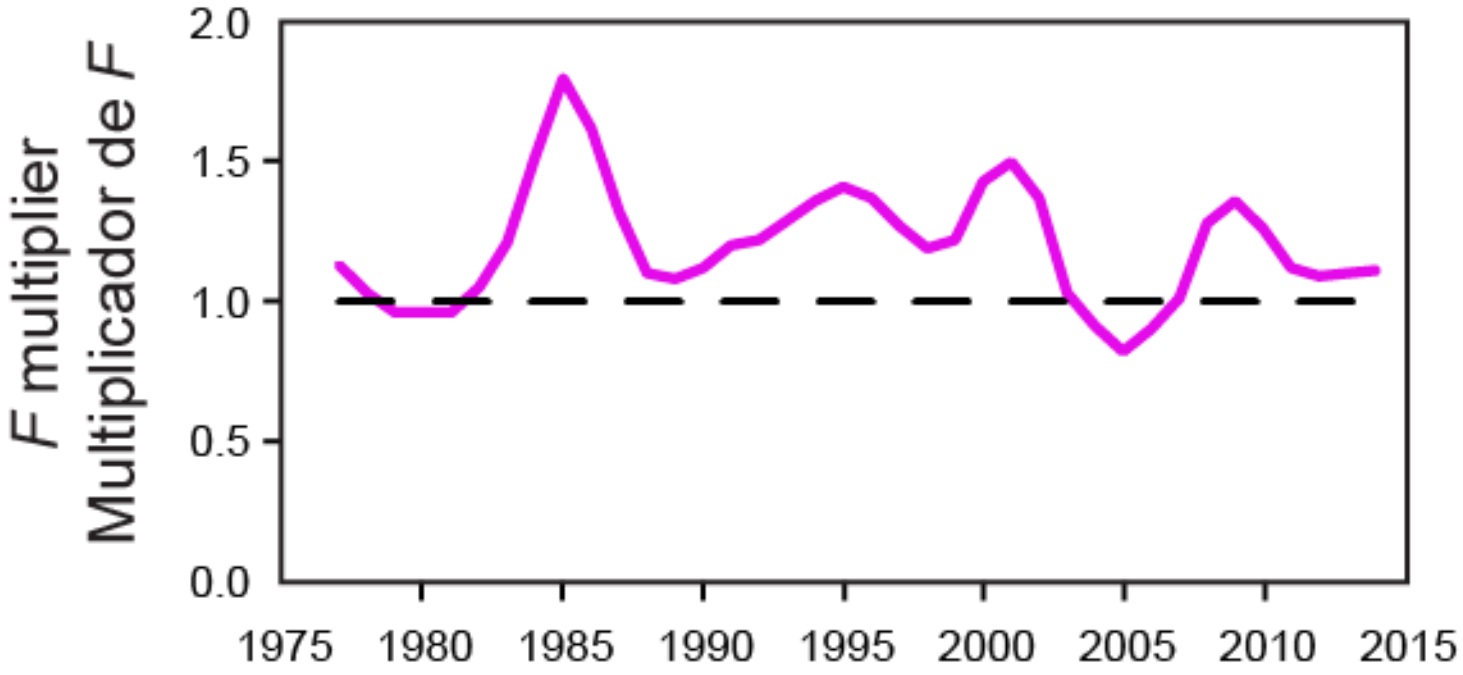
- Set the seasonal closure so that F equals FMSY for the species (YFT or BET) with the lowest FMSY.

Implementation performance

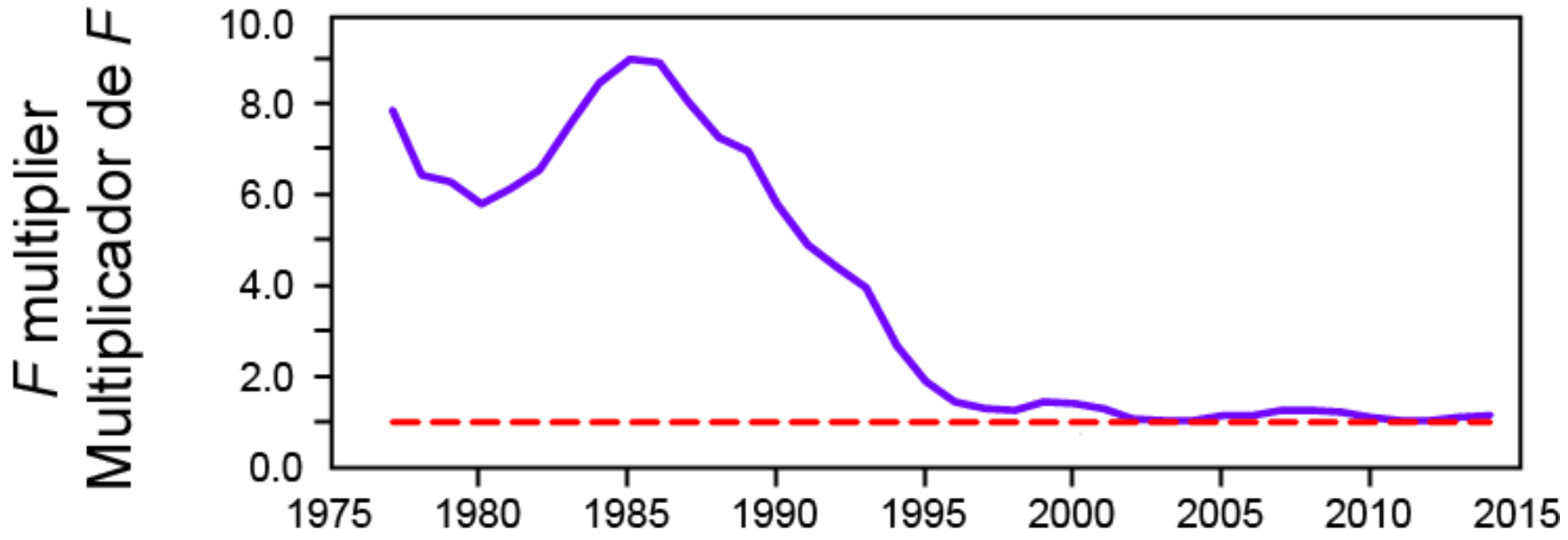
Year	Resolution	*F* multiplier		Closure (days)	
		YFT	BET	Recommended	Implemented
2002	C-02-04	1.12	1.85	31	31
2003	C-03-12	1.20	0.79	61, plus additional measures[1]	42
2004	C-04-09	1.12	0.62	61[2], plus additional measures[3]	42
2005	C-04-09	0.83	0.57	61, plus additional measures[3]	42
2006	C-04-09	1.02	0.68	69, plus additional measures[4]	42
2007	C-06-02	0.88	0.77	74	42
2008	None	1.13	0.82	84	49
2009	C-09-01	1.09	0.81	84	59
2010	C-10-01	1.33	1.13	62	62
2011	C-11-01	1.13	0.93	62	62
2012	C-12-01	1.15	0.95	62-74[5]	62
2013	C-13-01	1.01	1.05	62	62
2014	C-13-01	1.21	1.04	62	62
2015	C-13-01	1.11	1.14	62	62



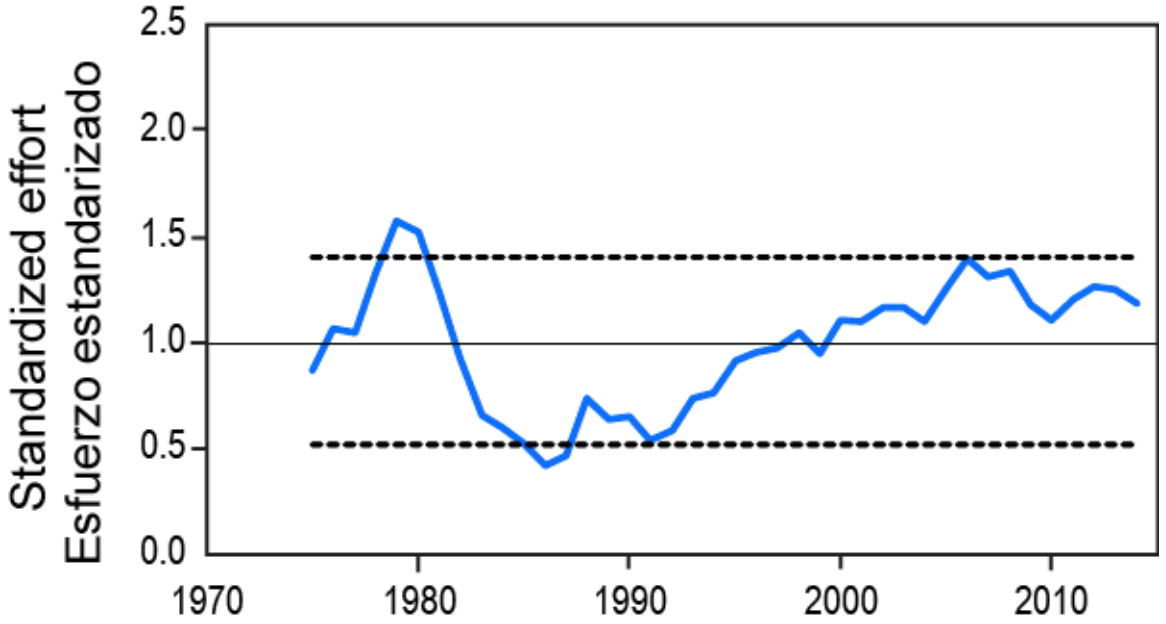
Estimated performance: YFT



Estimated performance: BET



Estimated performance: SKJ



Performance of the HCR

- Until 2010, the implemented closures were shorter than indicated by the stock assessments and recommended by the IATTC staff;
- Since then they have been consistent with both.
- The stock assessments, which cover the 1975-2014 period, estimate that for most of that period the fishing mortality of yellowfin and bigeye tuna has been below the level corresponding to MSY.
- No assessment is available for skipjack tuna, but the fishing mortality increased starting in the early 1990s and leveled out in the late 2000s.

Appropriateness of the limit reference point

- Not possible to evaluate the appropriateness of the limit reference points
- Extensive meta-analysis shows
  - no evidence for depensation
  - when fishing pressure is reduced, stocks almost always increase in abundance
  - hard biomass-based limit reference points can be set at low levels of abundance.
- The appropriateness of the HCR with respect to the limit reference points has not been thoroughly tested.
- A preliminary management strategy evaluation (MSE) for bigeye tuna indicated that the HCR based on F_{MSY} is appropriate and will result in a low probability of exceeding the limit reference point.

Future work

- A more comprehensive MSE is needed to evaluate the HCR.
- Alternative HCRs that include soft and hard limit reference points, use biomass-based reference points, and establish well-defined management actions when reference points are exceeded, should be considered.