



# Summary of empirical Harvest Control Rule for the Torres Strait tropical rock lobster (TRL) fishery

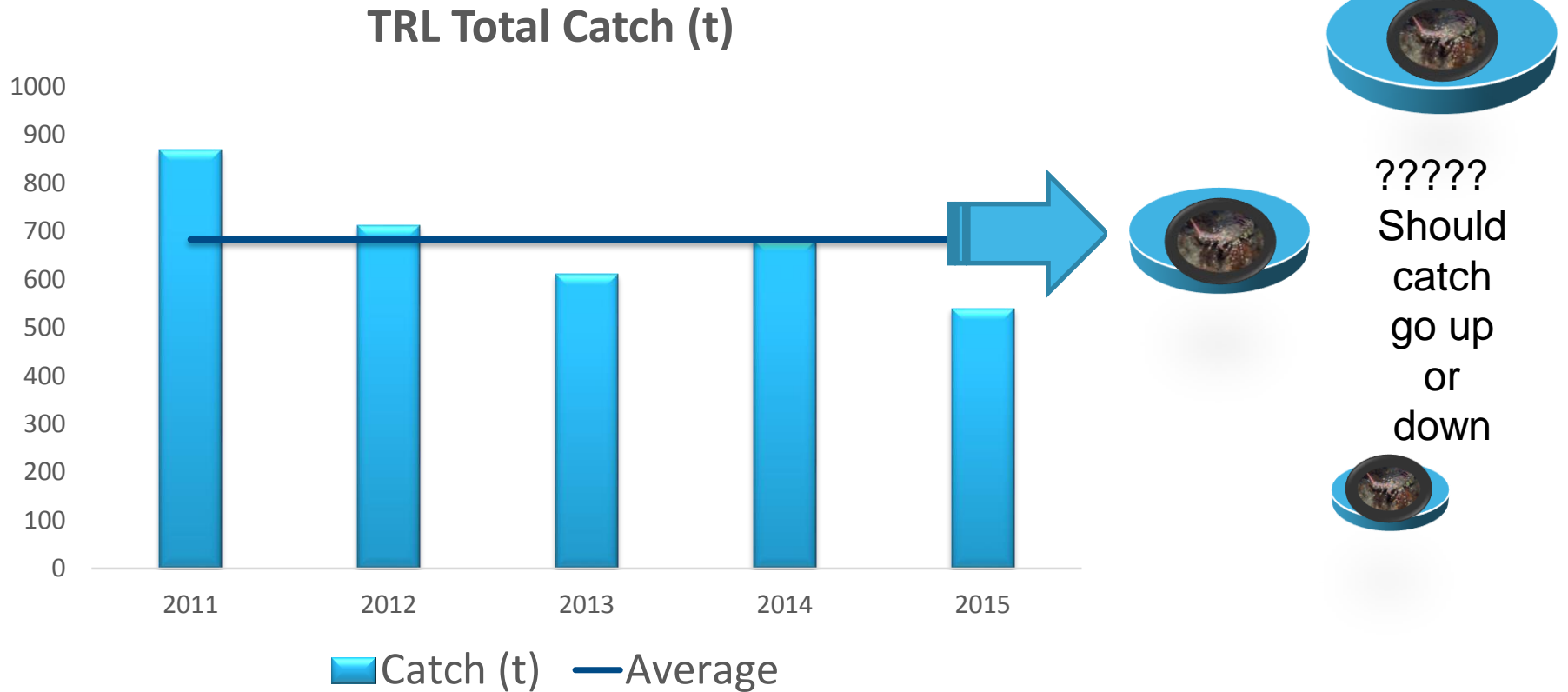
Éva Plaganyi, Roy Deng, Darren Dennis, Robert Campbell, Mick Haywood, Trevor Hutton, Mark Tonks

CSIRO Oceans and Atmosphere  
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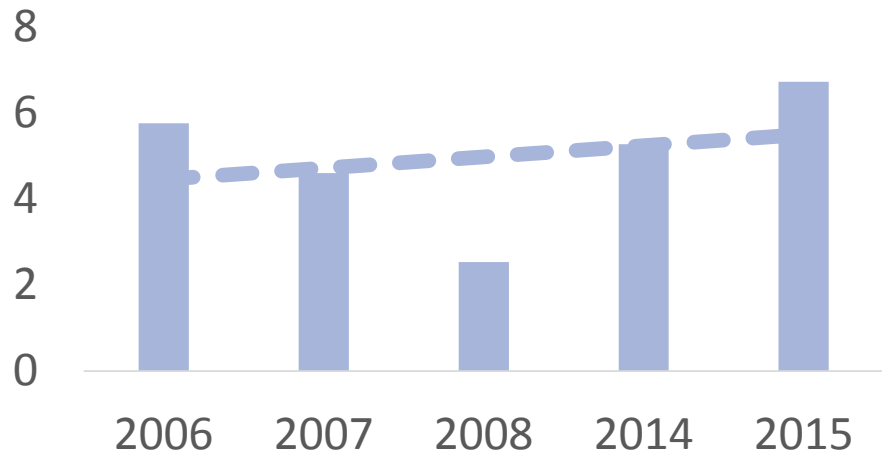
TRLRAG March 2017

# Average catch and how to scale up or down

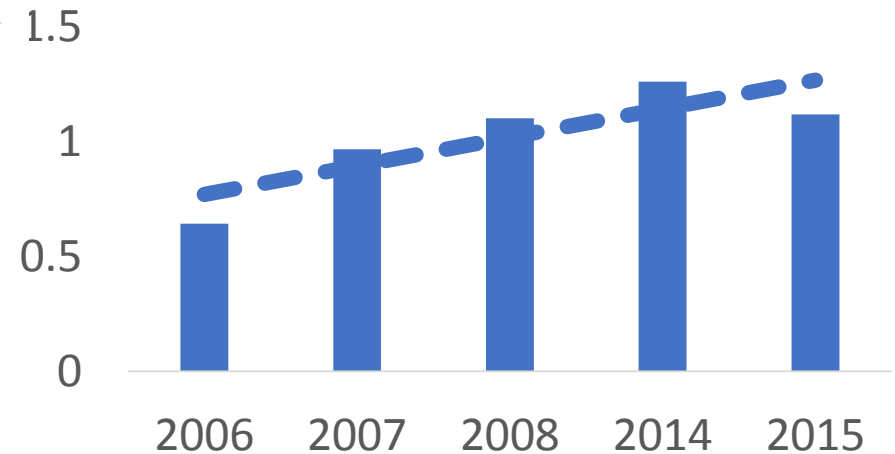


# Indicators to tell us how many lobsters there will be next year: (A) Survey data

Pre1 lobster abundance

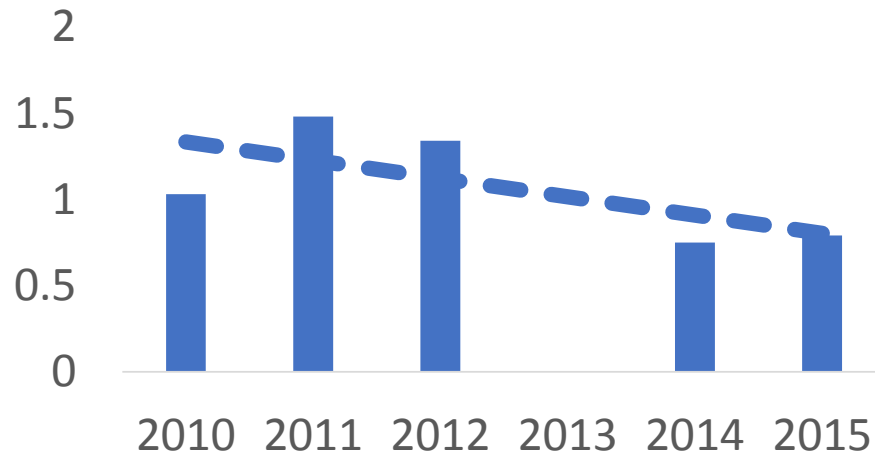


Pre0 lobster abundance

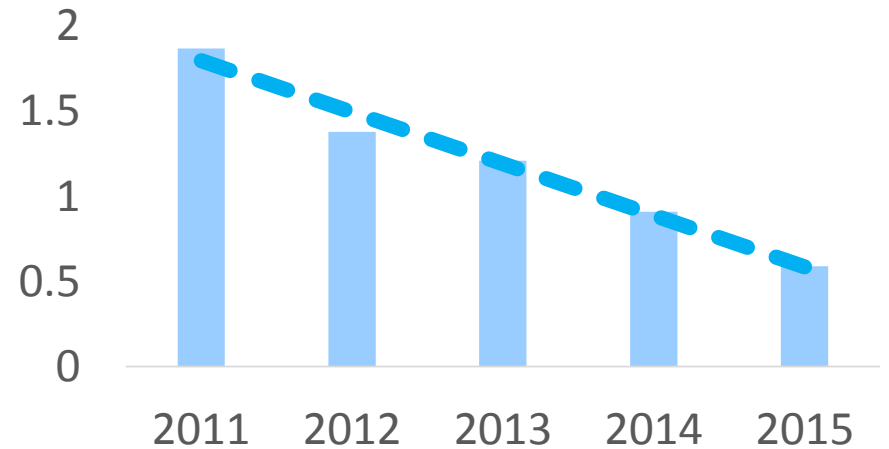


# Indicators to tell us how many lobsters there will be next year: (B) CPUE data

Catch rates TIB



Catch rates TVH



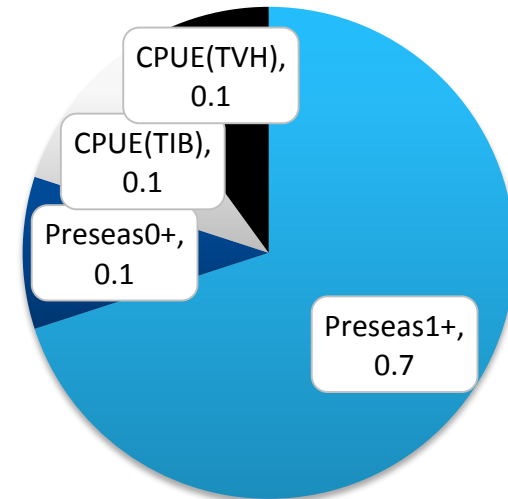
# Use information from all 4 indicators

- Slopes all based on trend using last 5 years' data
- Use a mathematical trick (logs) to dampen trends to reduce very large changes in RBC



$$RBC_{y+1} = wt\_s1 \cdot (1 + s_y^{presurv,1}) \cdot \bar{C}_{y-4,y} + wt\_s2 \cdot (1 + s_y^{presurv,0}) \cdot \bar{C}_{y-4,y} \\ + wt\_c1 \cdot (1 + s_y^{CPUE,TVH}) \cdot \bar{C}_{y-4,y} + wt\_c2 \cdot (1 + s_y^{CPUE,TIB}) \cdot \bar{C}_{y-4,y}$$

Relative weightings  
for different data  
inputs



# eHCR Rule selected by the TRLRAG



RBC = Combined Average Slope of Indicators \* Average Catch

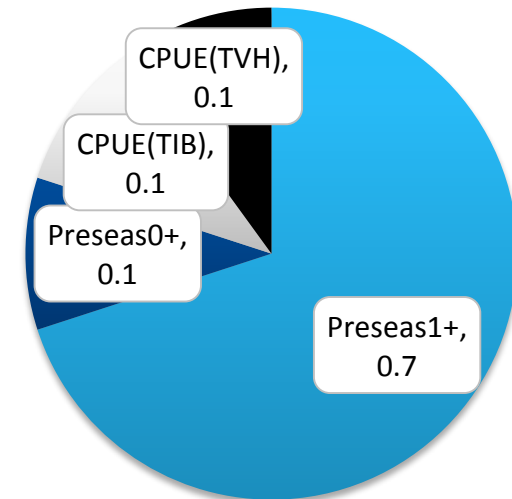
Ensure RBC is never greater than 1000t

Precautionary check in rare bad years: if Preseason 1+ index is very low then perform a stock assessment immediately

Check eHCR performing as expected by running a full stock assessment every 3 years

eHCR = Empirical Harvest Control Rule

Relative weightings for different data inputs



# Revised HCR spreadsheet



## A. Instructions

- > Cells shaded light yellow can receive entered values. Cells shaded light blue show results, but cannot be changed.
  - > Enter data updates in the yellow-shaded cells in Section B below. Example values have been entered for 2016. These need to be changed to the real values when these are available. Data will be provided annually.
  - > Total Catch to be entered = TIB+TVH+PNG catch in tons (live weight).
  - > Preseason survey indices = the standardised values obtained from the November survey; the last 5 values of each series need to be checked
  - > CPUE = the standardised values obtained from the analyses run in October; note that if the earlier values change in the standardisation, the last 5 values of each series all need to be updated for the calculations below.
  - > The resulting 2017 recommended biological catch (RBC) calculated using the Harvest Control Rule is shown in Section C, together with comparative values for the 2015 and 2016 HCR RBCs for comparison. Historical TACs and the 2017 RBC are plotted compared to the historical average TAC.
  - > Consolidated historical and entered data are summarised in Section D and the Survey and CPUE regressions through the recent data are plotted. Further information on the HCR is provided in Section E.
- (Spreadsheet by CSIRO, contact Dr Eva Plaganyi-lloyd: Eva.Plaganyi-lloyd@csiro.au)



## B. Data Entry Section

Year	Total Catch	Survey indices		CPUE indices	
		Preseason 0+	Preseason 1+	CPUE_TIB	CPUE_TVH
2015	562.3				
2016	571.8	1.18	2.80	1.21	1.01



## C. RBC Calculator

Year	RBC	Forecast RBC
2015	724.2	604.3
2016	681.4	606.8
2017	624.1	539.3

RBC-Forecast

77.1

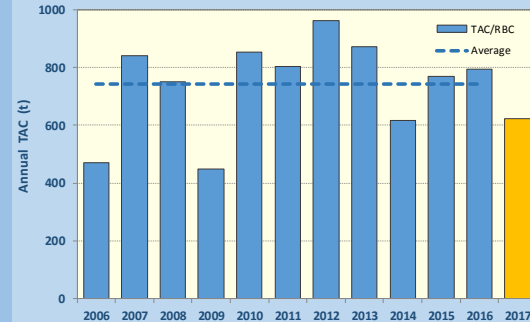
HCR 17.3

**RBC (AUS AND PNG)  
CALCULATED FOR NEXT YEAR**

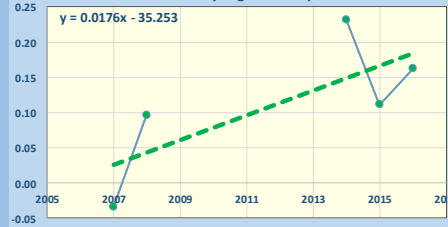
## D. Consolidated Catch, Indices and RBCs table

Year	Total Catch	Survey indices		CPUE indices		TAC / RBC	Average TAC
		Preseason 0+	Preseason 1+	CPUE_TIB	CPUE_TVH		
		Seller+QA Int-1					
2006	429.7	0.64	5.76	0.76	0.69	471	744
2007	756.6	0.97	4.60	0.86	0.96	842	744
2008	505.4	1.10	2.53	0.88	0.83	751	744
2009	388.4			0.89	0.63	450	744
2010	718.7			1.10	1.14	853	744
2011	869.2			1.33	1.75	803	744
2012	697			1.26	1.41	964	744
2013	604.2				1.17	871	744
2014	682.4	1.26	5.27	0.90	0.91	616	744
2015	562.3	1.12	6.72	0.86	0.58	769	744
2016	571.8	1.18	2.80	1.21	1.01	796	744
2017						624	

Historical TACs and Harvest Control Rule RBC



Preseason 0+ survey regression updated to 2016



CPUE\_TIB regression updated to 2016

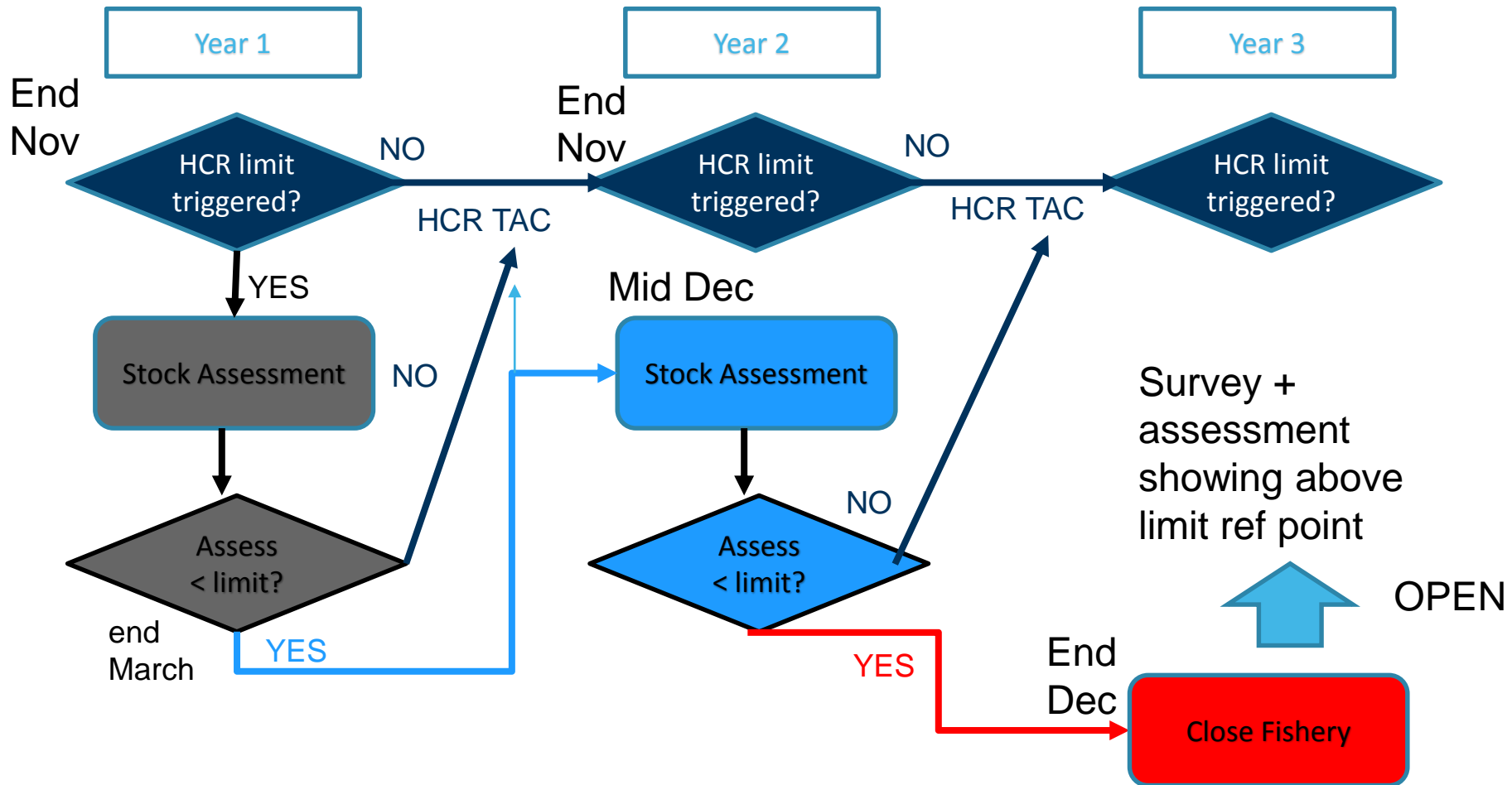
Preseason 1+ survey regression updated to 2016



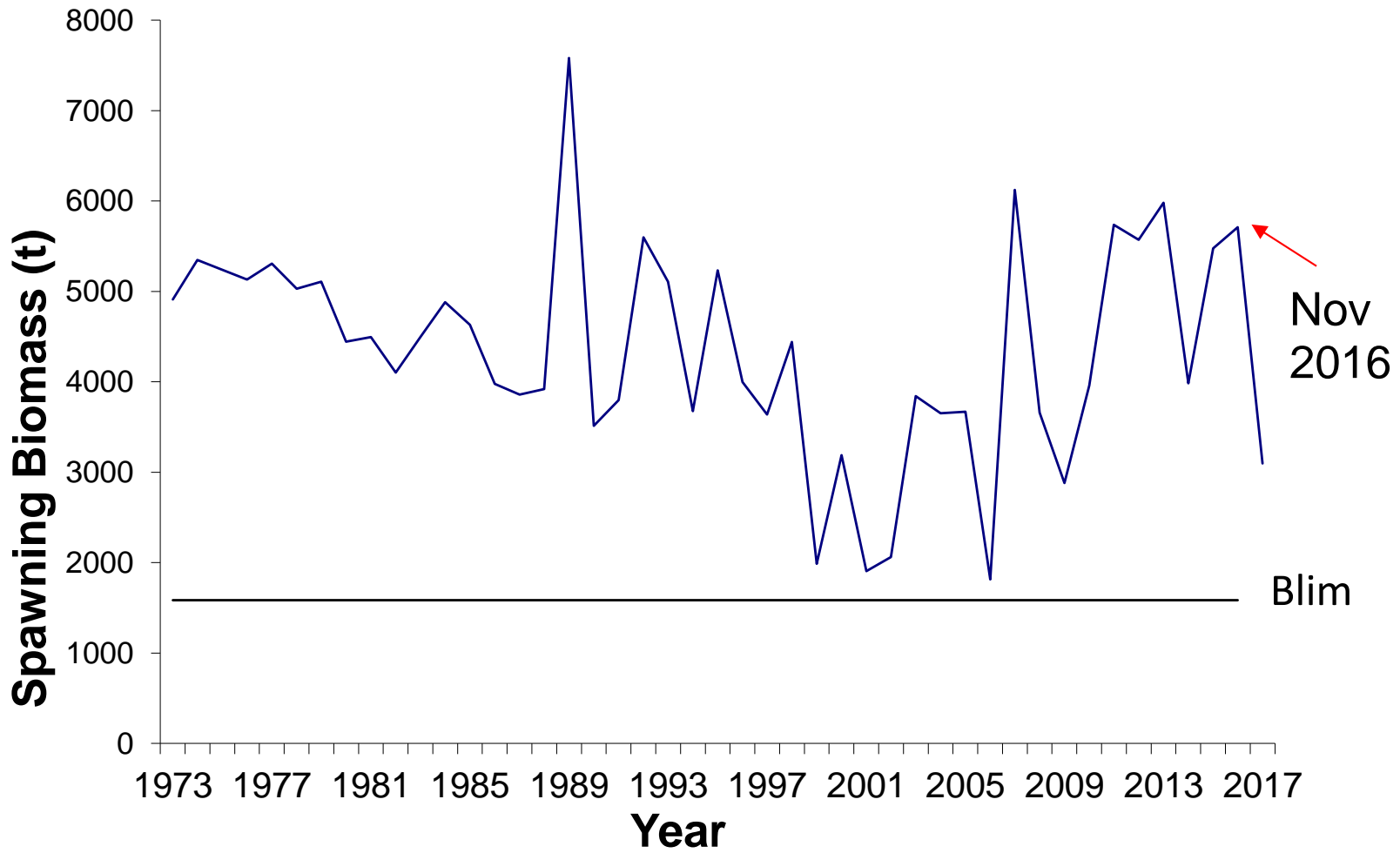
CPUE\_TVH regression updated to 2016

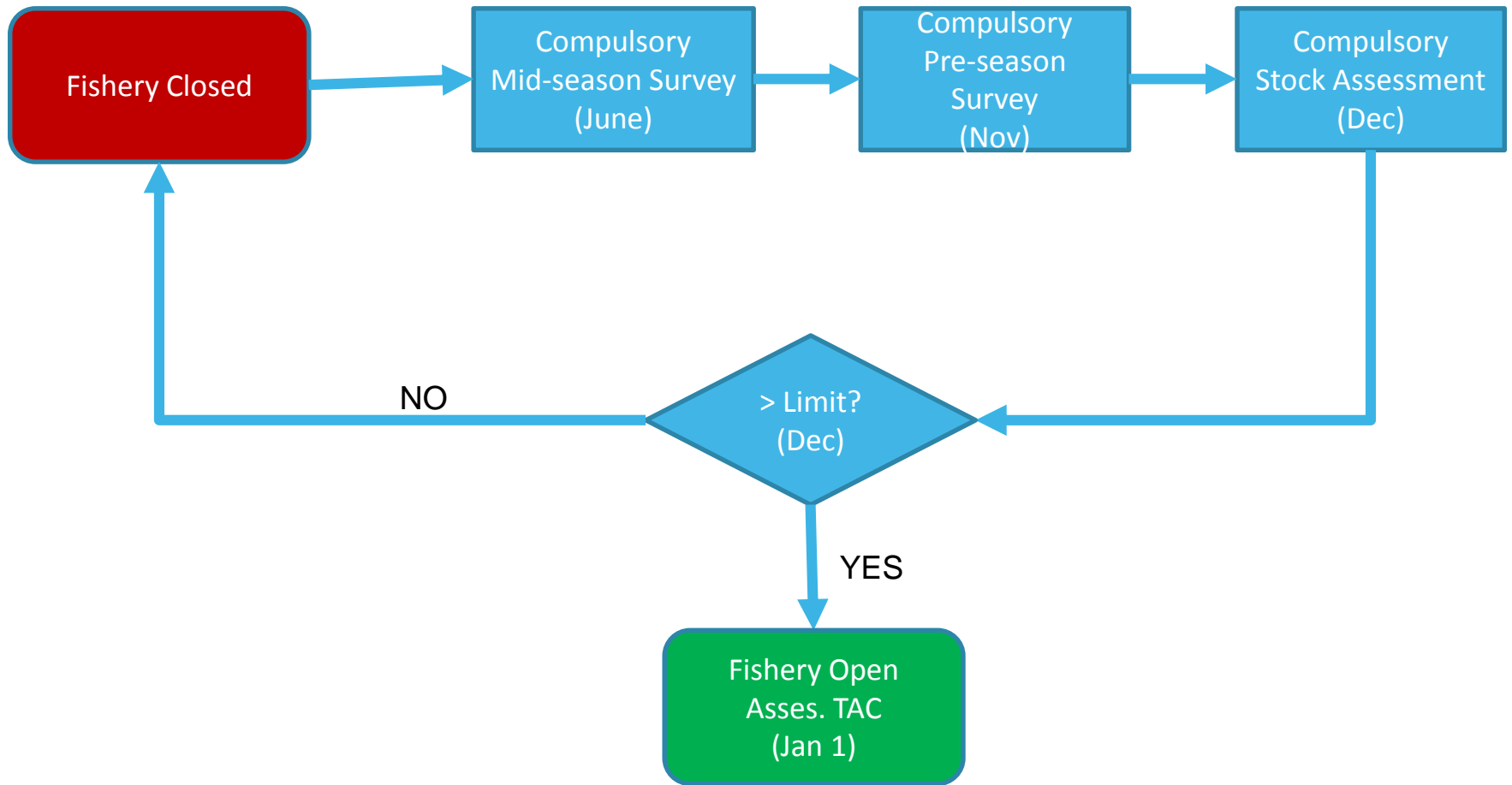


# Need 2 flowcharts









# Thank you

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