

# Qualitative analysis of fisher response to management strategies and the impacts on recreationally important fish species in WA

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# Demersal fish and fishing

- West Coast Bioregion & metropolitan zone- concern for demersal fish populations
- Commercial wetline fishery banned in metro. zone
- Metropolitan zone- high recreational fishing effort



# Recreational fishing models

Seasonal closure (metro. zone) currently in consideration

Potential alterations in fisher behaviour:

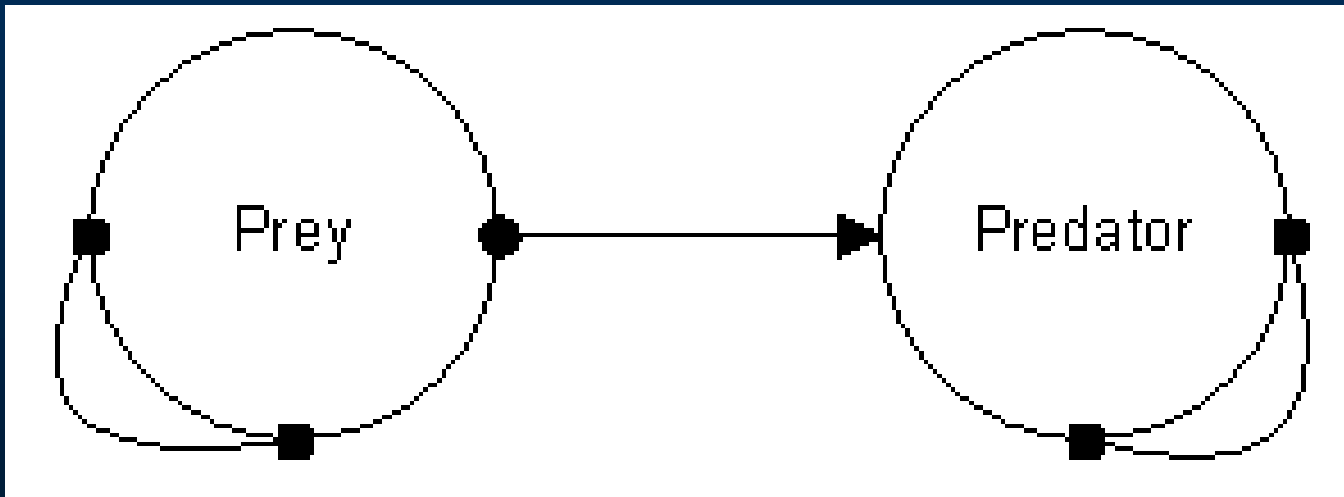
- Increased effort for other target species/fishing methods;
- Shift fishing effort outside the metro. zone;
- Increased participation in alternative pastimes.

Overall impact on fish populations in the West Coast Bioregion?



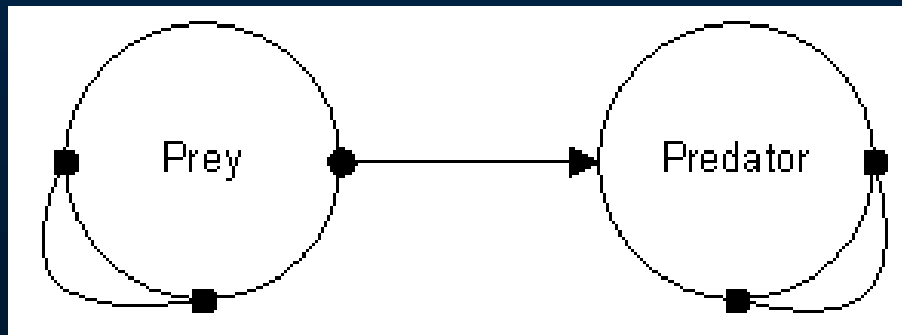
# Qualitative modelling

- Few data required (+,-,0) → useful in data limited situations



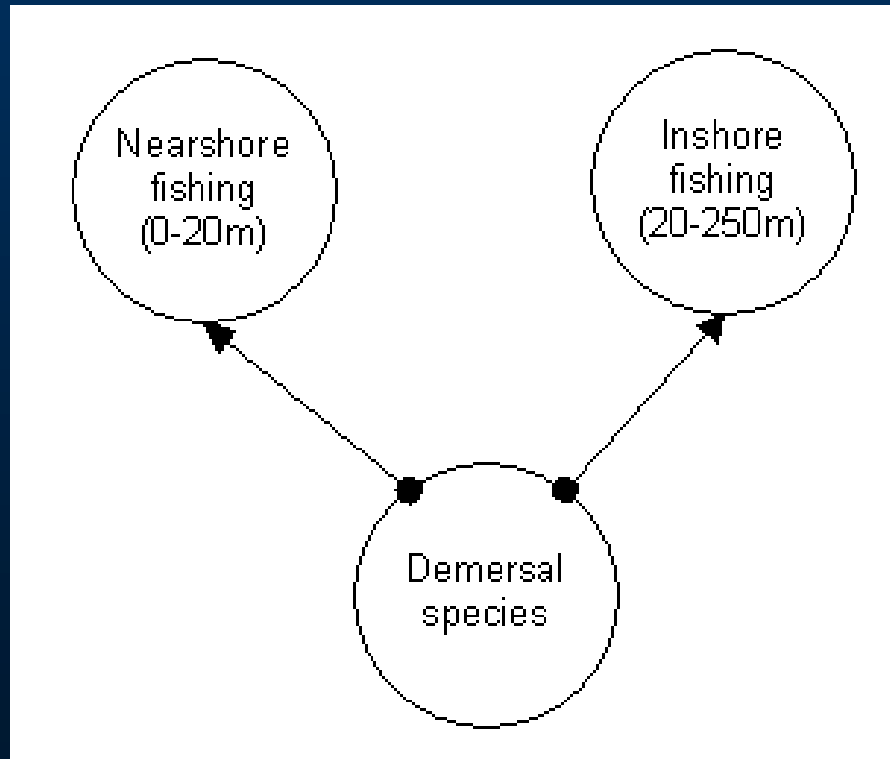
- The community matrix details direct effects
- adj. (-**A**) details both direct and indirect effects of a press perturbation on species abundance

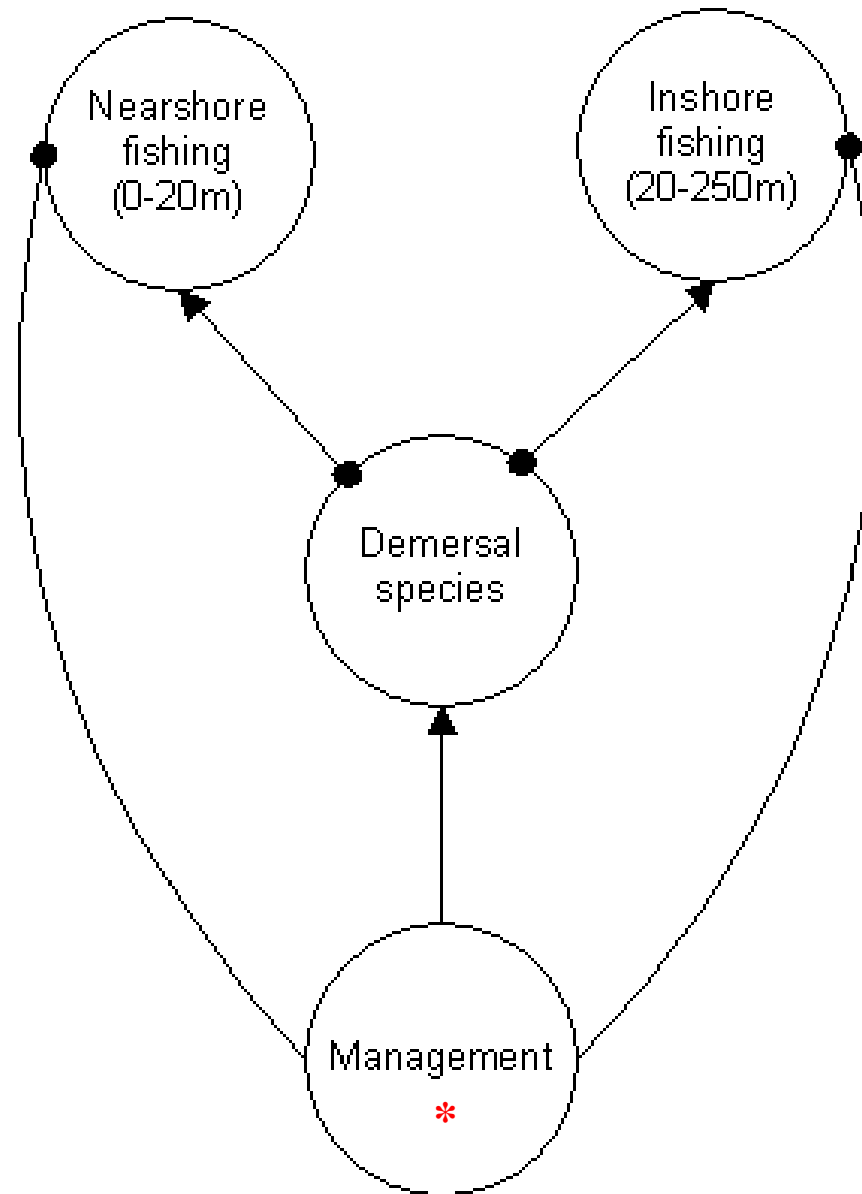
$$\text{adj. } (-\mathbf{A}) = \begin{array}{l} 1.\text{Prey} \\ 2.\text{Predator} \end{array} \begin{bmatrix} + & - \\ + & + \end{bmatrix}$$

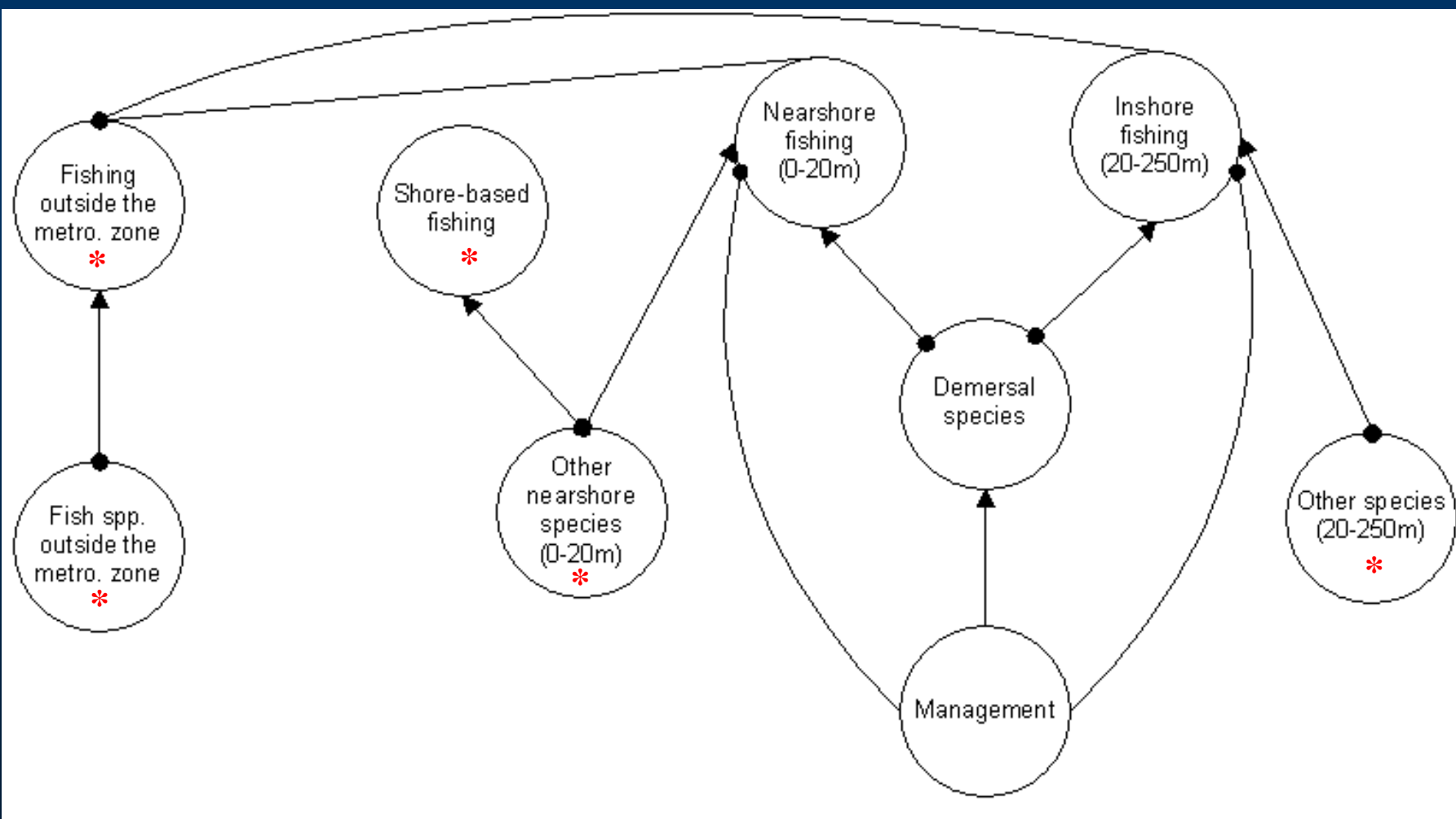


# Qualitative recreational fishing model

- Model to capture all potential changes in fisher behaviour
- Simple → complex

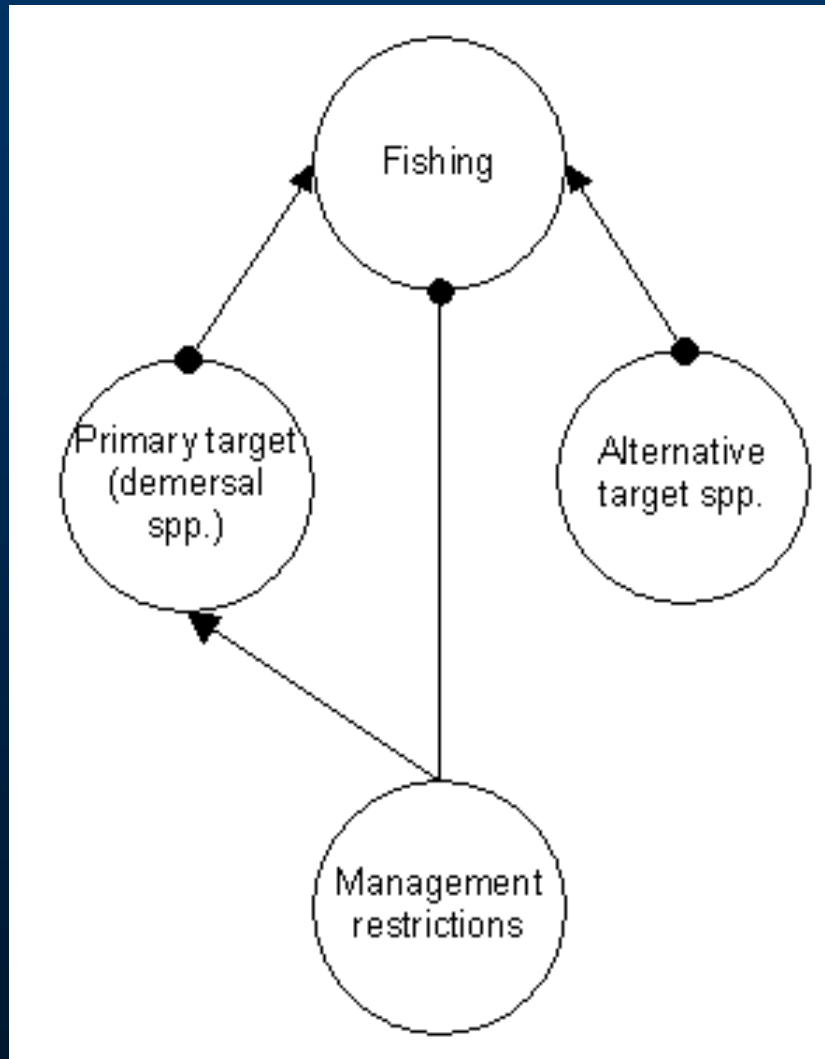


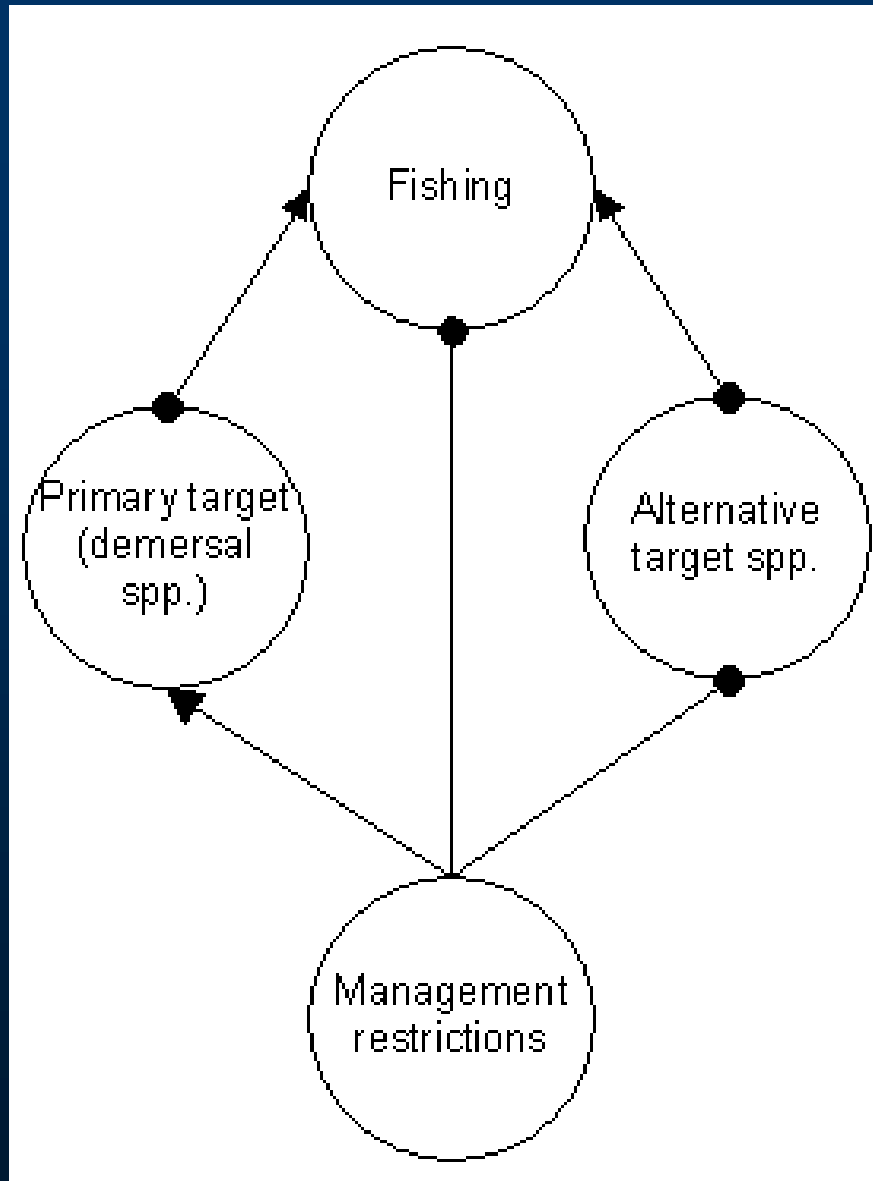






# Qualitative 'core' model





# Core model prediction matrix

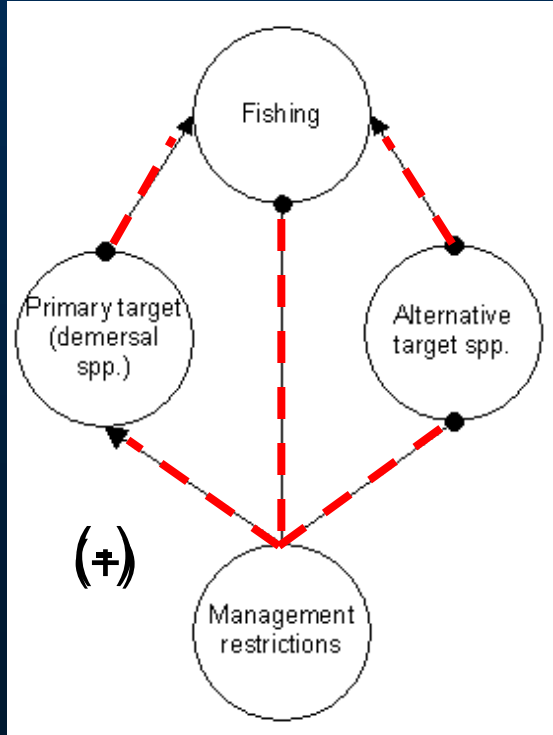
Seasonal closure

	1.	2.	3.	4.
1.Fishing	+	+	+	-
2.Primarytarget	-	+	-	+
3.Alternativetarget	-	-	+	-
4.Management	0	0	0	+

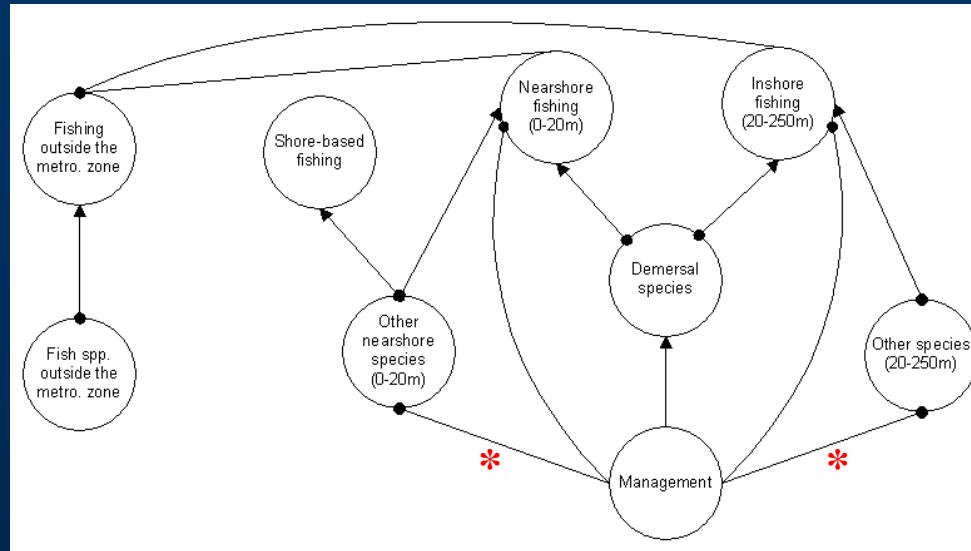
## Ambiguity involved in some predictions

	4.
1.Fishing	-,-,+
2.Primarytarget	+
3.Alernativetarget	-,-,-,+
4.Management	+

3. Separation of fishing target species



## Similar results obtained with more complex model structure



Following an increase in management:

- Reductions in most fishing types (nearshore, inshore and shore-based) were predicted
- Fishing elsewhere predicted to increase
- Reductions in all species excluding the species protected by seasonal closure were predicted

# Conclusions

- Species protected by seasonal closure likely to increase in abundance due to management
- Switching behaviour and fishing 'spikes' after the re-opening likely to lead to decline in other species

**Additional management strategies** may be necessary to combat increased pressure on alternative species (e.g. herring) and fishing outside metro. zone

**Fisher behavioural data** - determine the effectiveness of management strategies

# Thanks

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