Management decision rules based on bioeconomic modelling of the Tasmanian rock lobster fishery

Caleb Gardner, Andre Punt, Bridget Green

TAFI is a joint venture between the State Government and the University of Tasmania

Key points

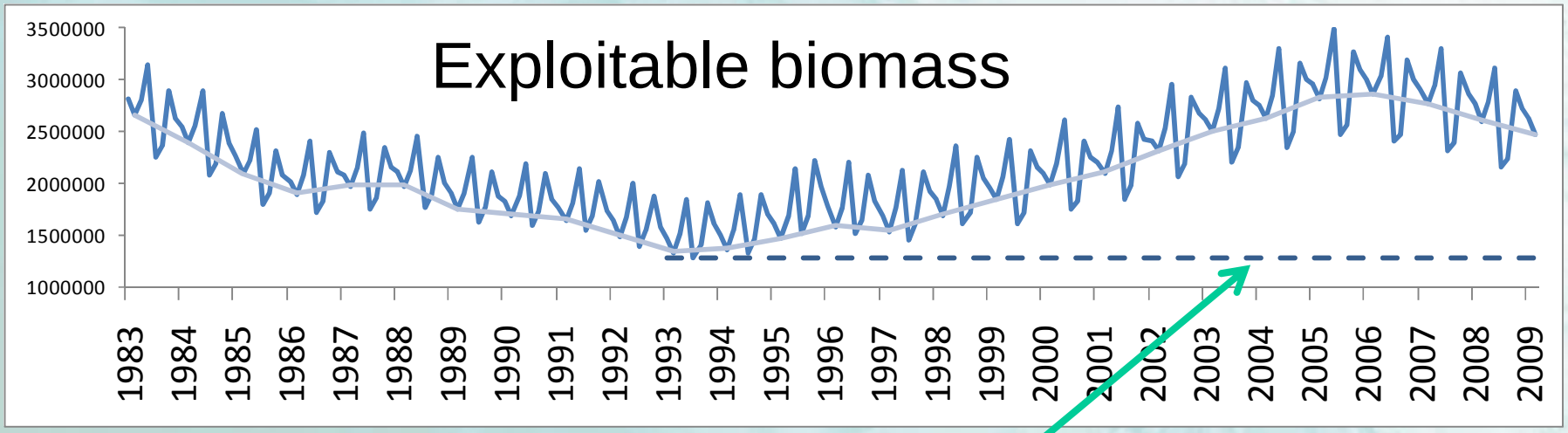
1. ITQs introduced with limit performance measures only

2. More recently, economic measures have been incorporated

3. ..which has lead to greater industry acceptance and drive for change

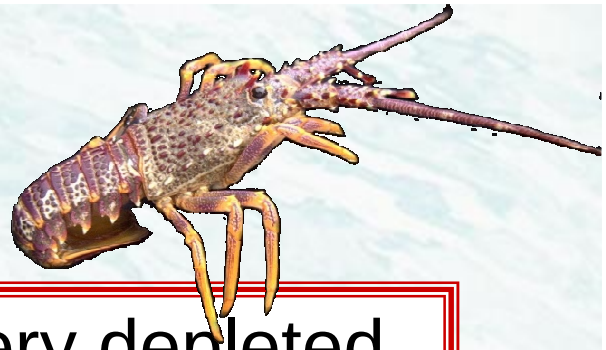
Trends in the fishery

Stock rebuilding for ~16 years, driven by LIMIT performance measures only



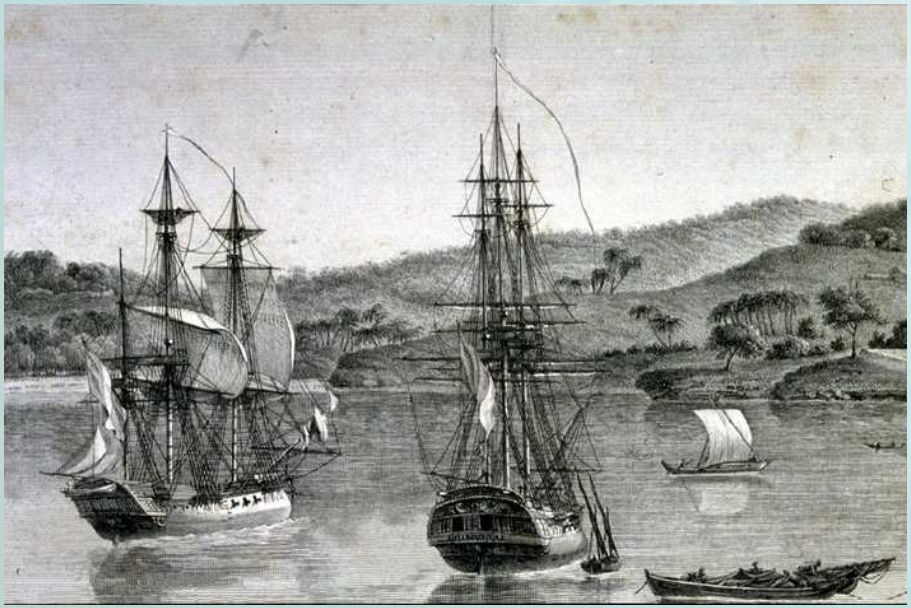
The limit (no target!)

Trends in the fishery



So….recent rebuilding, but still very depleted

1. Exploitable biomass 5% of virgin in SE
2. Catch rates in 2009 20% of those in 1946
3. Only 50% recreational pots catch a lobster



Trends in the fishery

Model structure

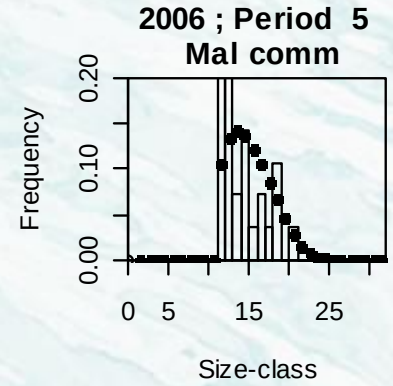
1. Single species
2. Length / sex based
3. Fits to
   - length data
   - average weight
   - catch by number
   - catch mass (commercial, recreational, illegal)
   - catch rate
   - fleet……..

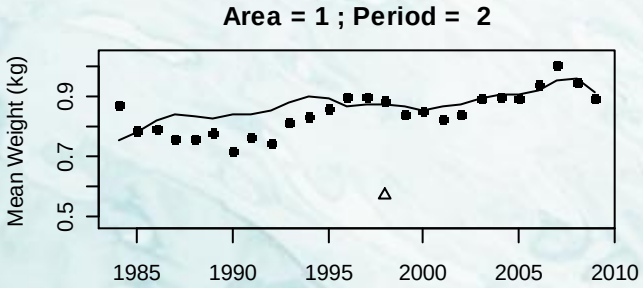
Since 2009…Catch rate (kg / potlift)

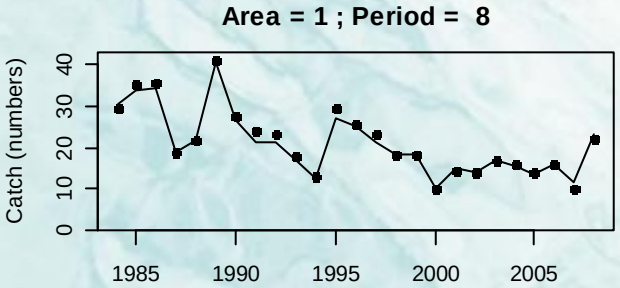
Provides the hook for economics …

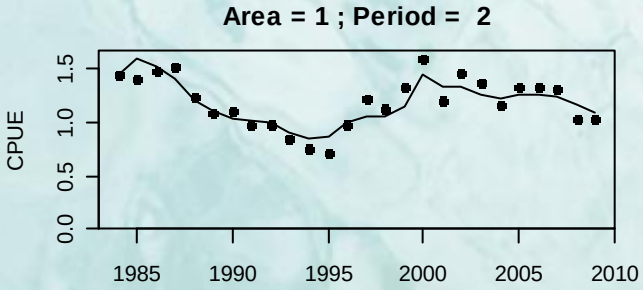
Kg ~ revenue

Potlift ~ costs









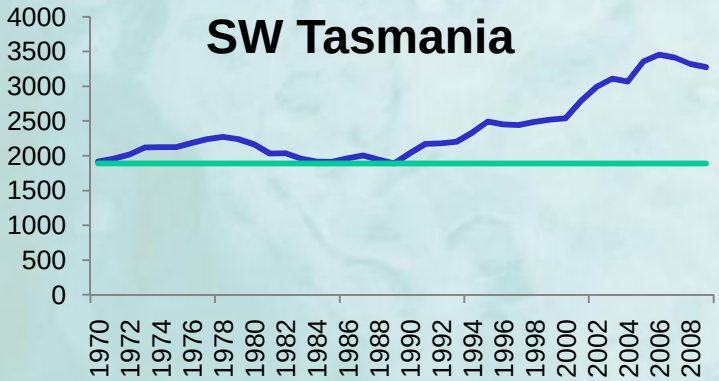
1998-2009 LIMIT Performance Measures

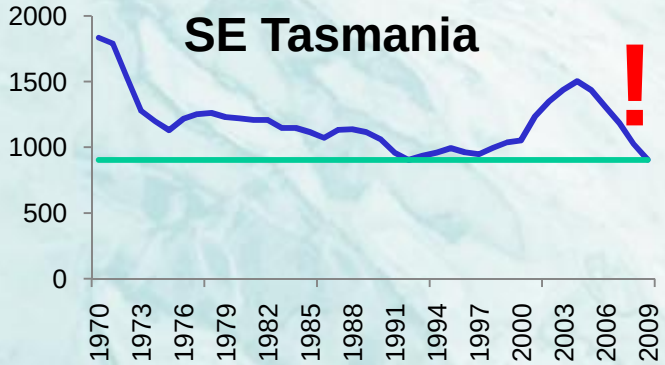
1. Exploitable biomass to remain above 1993 (worst year) ----**Short run economic**
2. Egg production above 25% -----**Long Run economic / ecosystem**
3. Fleet size above 220 vessels ---- **Economic (belief that fleet rationalisation was bad for the community)**

The new regime….
…….new limits …and targets

1. New limits are historical or 10 y levels of:
   - catch rate (short run economics),
   - egg production (long run economics / ecosystem), and
   - biomass (ecosystem)….and more

for example, if total biomass falls to lowest level, then catch must be reduced.





The new regime….
…….new limits …and targets

2. Targets (the interesting part)

- higher economic yield
- lower income volatility
- lower business risk
- higher capitalisation of quota units
- lower ecosystem impact
- (easier access for new entrants)

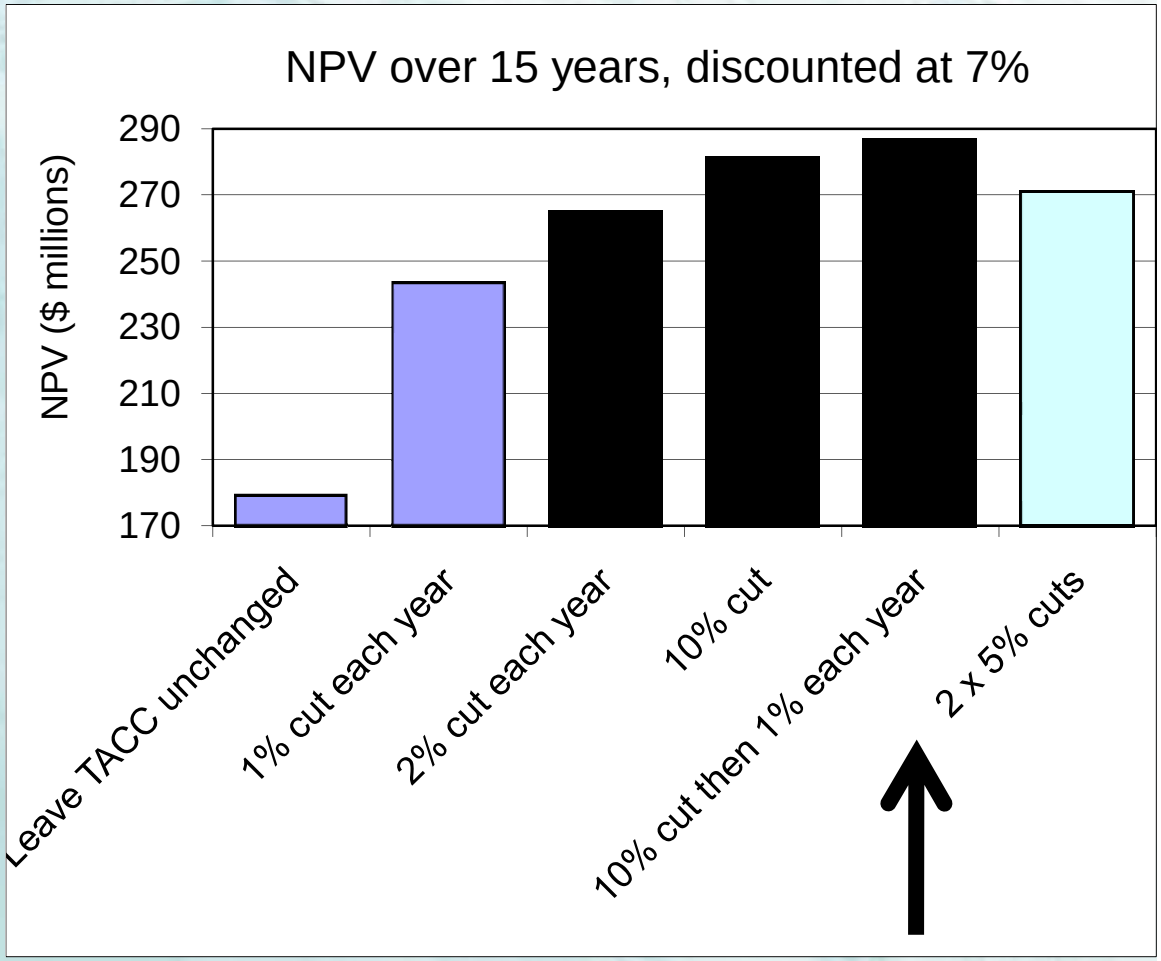


For example..selecting the TACC (total allowable commercial catch….the quota)

Step 1
Determine TACC pathway that optimises economic yield
(using bio-economic model)

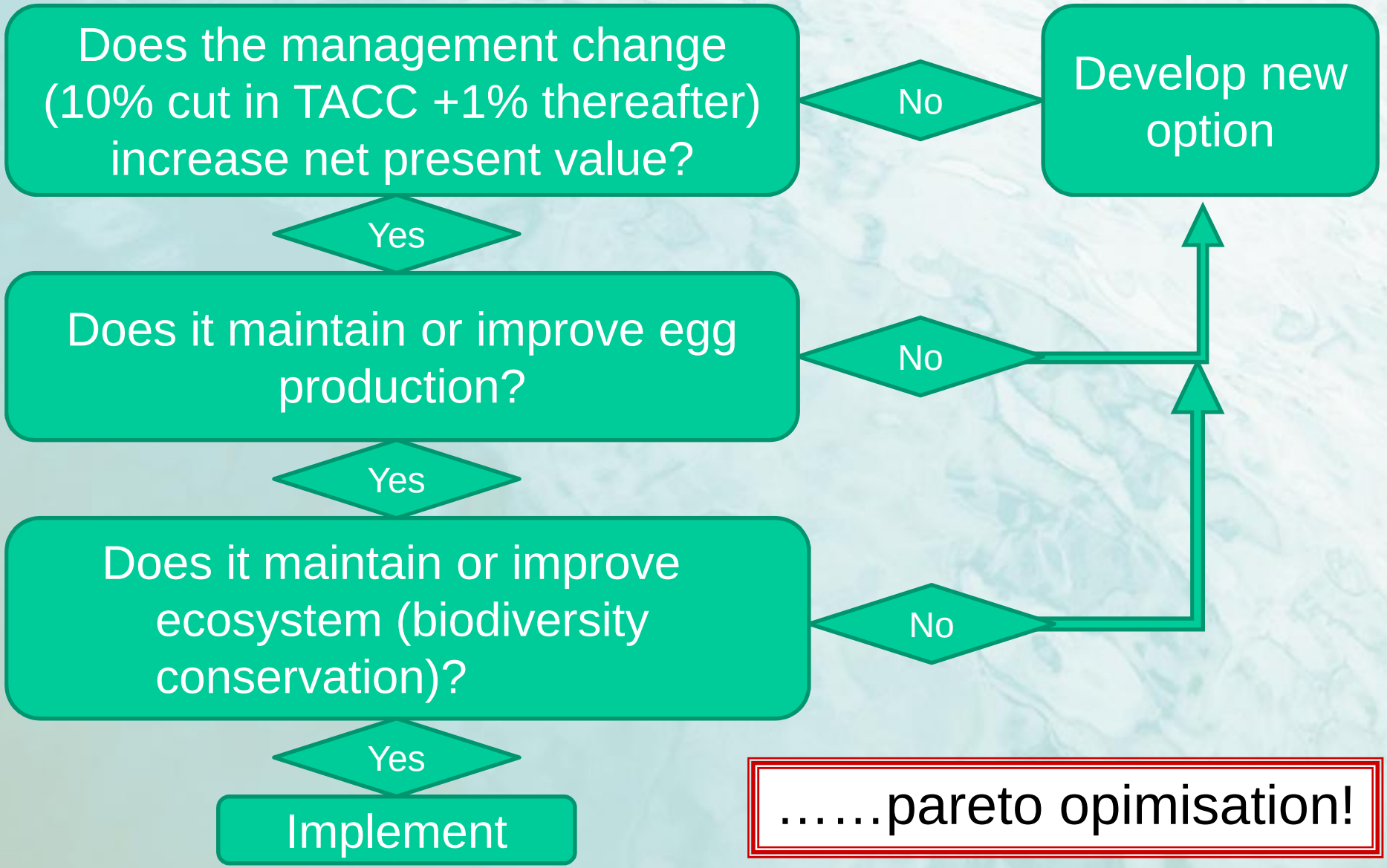
Green was government proposed action (for "sustainability")

Black was "industry" proposed (for profit)

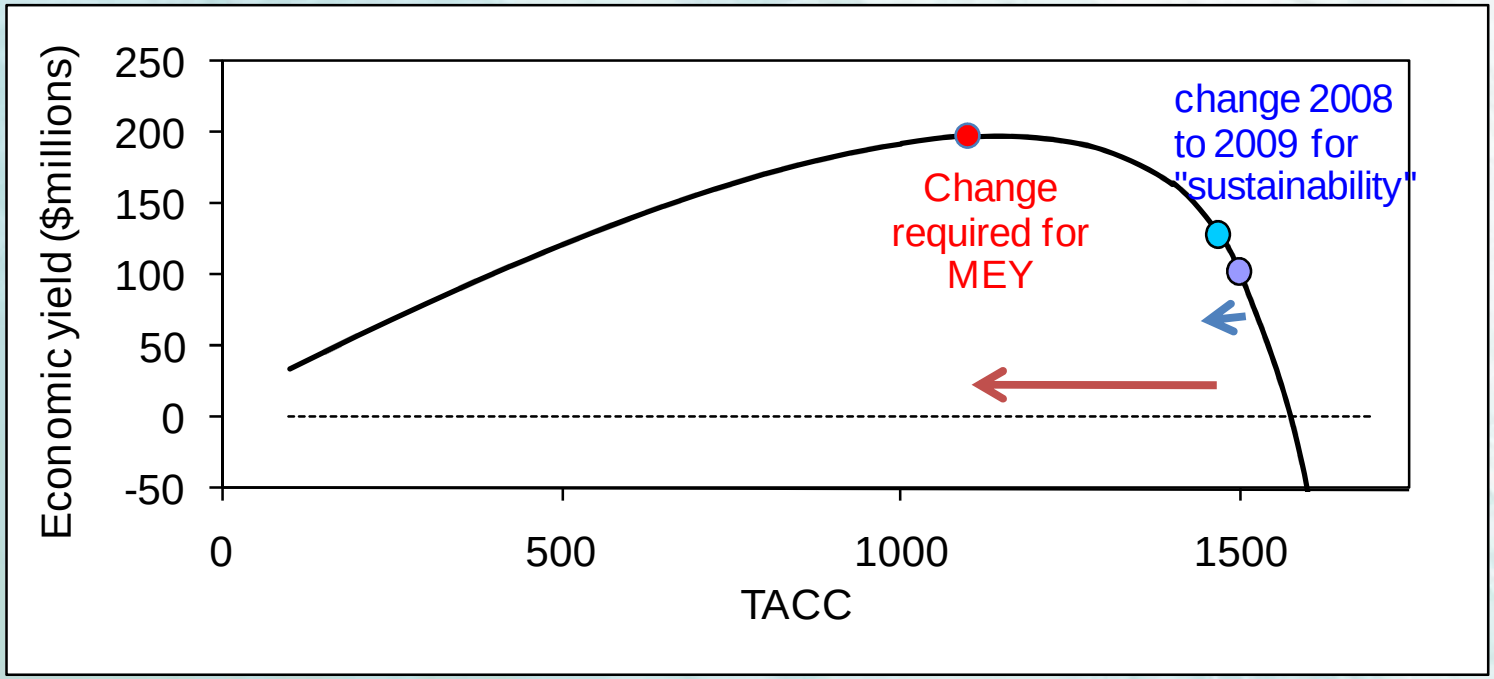


So, best option for $$$$, is 10% cut now, 1% per year thereafter

Target performance measures have a hierarchy

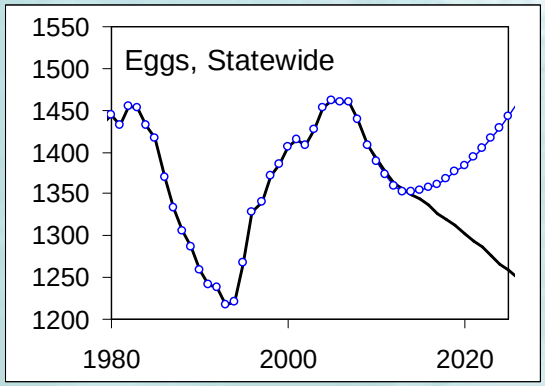


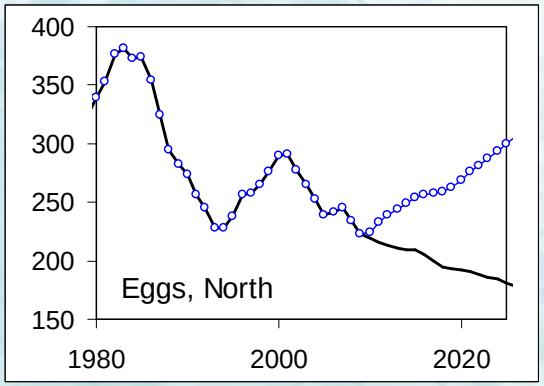
Q: Why make ecosystem the last step in decision process?

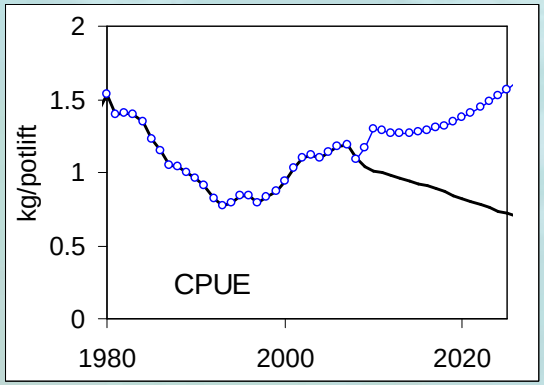


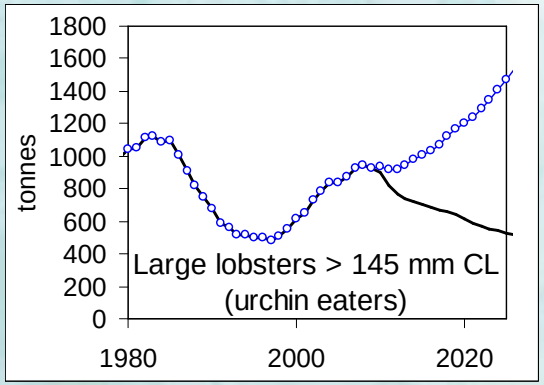
A: Because ecosystem targets are ambiguous + TACCs that target maximum economic yield (MEY) are more aggressive, not resisted by industry, and the minister is compelled into action.

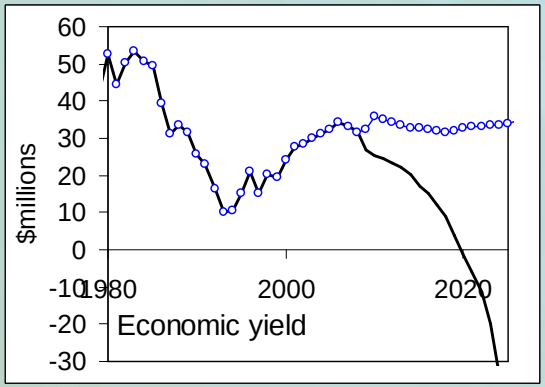
Other rule changes

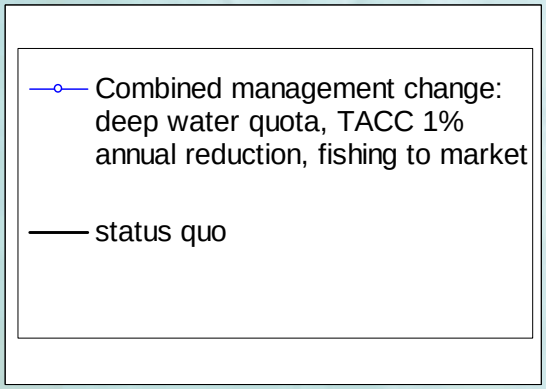












Other industry led options for change:

1. Special quota provisions for fishing deep water
2. Smaller size limits in slow growth areas
3. Translocating lobsters between regions
4. …. and 5 more

VOTING IN OCTOBER

Some issues to restoring stocks

1. Very weak property rights in ITQs, especially loss to recreational fishers and MPAs

2. Need for charismatic industry leaders to motivate change across fleet (>200 fishers)

3. Model-phobia (in some states)

4. NPV and MEY are not industry metrics – but fishers like CPUE targets (1.5 kg/potlift in 10 years)

Conclusions

1. ITQs do not lead to efficient outcomes autonomously (because property rights are weak)

2. Need for targets to drive management of ITQs in most Australian fisheries

3. Economic metrics from bioeconomic models effective in engaging industry to manage for profits