

The Southern and Eastern Scalefish and Shark Fishery (SESSF): history, management and lessons learnt

David Smith¹, and David Galeano²

¹CSIRO Wealth from Oceans National Research Flagship, CSIRO Marine & Atmospheric Research

²Australian Fisheries Management Authority



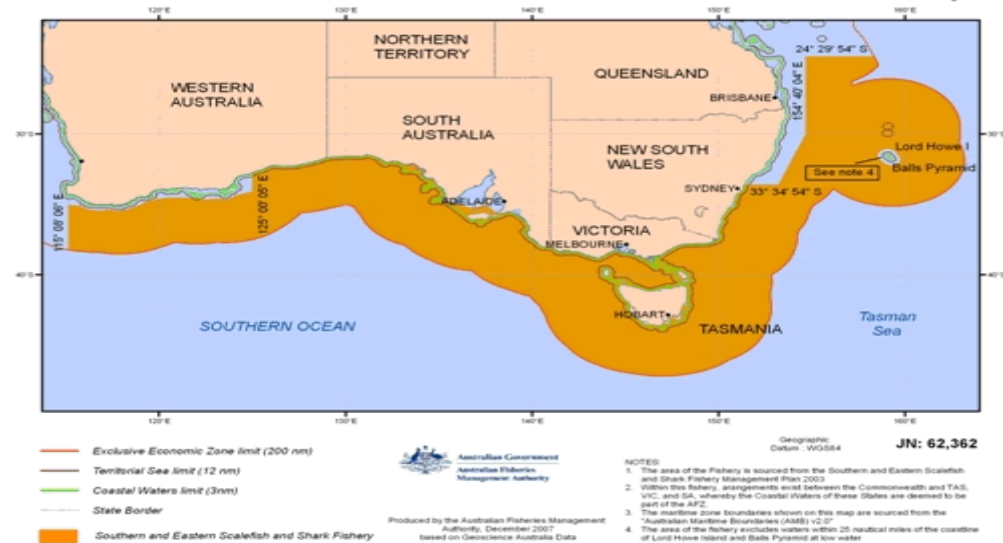
Overview and Acknowledgements

- Fishery Overview
- Brief History (Smith and Smith 2001)
- Ministerial Direction to AFMA and 'Securing our Fishing Future'
 - The HSP and Tier Rules (Australian Govt, 2007, Smith et al 2007, 2008)
 - B_{MEY} and bioeconomic modelling (Kompas and Che 2007)
 - Fishery restructure (Galeano 2008)
- What has worked and what hasn't
 - The Alternative Management Strategies study and 'Whole of fishery' MSE
 - (Smith et al 2004, 2007a, b; Fulton et al 2007)
- Conclusions

Data-poor species: the SESSF – a complex multispecies fishery

- Australia's oldest demersal fishery
- Sub-tropical to sub-Antarctic, coastal to >1200m
- Trawl, gillnet, longline, Danish seine, trap
- Total catch 25,000 tonnes in 2006-07
- Total value \$96.3 million in 2006-07

Area of the Southern and Eastern Scalefish and Shark Fishery



Management and assessment in the SESSF

- Over 80 species routinely landed
- Under ITQ management since 1992, Currently 34 species and stocks in the quota management system
- Fisheries
 - SET, Shark, GAB, 'non-trawl'
- Management Advisory Committees
 - SETMAC, GHATMAC, SHARKMAC
- Resource Assessment Groups
 - SESSFRAG, Slope, Shelf, Deep, Shark, GAB
- Spatial management
 - Currently 35 area closures
- Formal harvest strategies introduced in 2005
 - Four Tier system (based on data availability and quality)
 - Formal harvest control rules at each Tier

Brief History

- **Commonwealth trawl**
 - Steam trawlers in the early 1900s targeting flathead
 - Danish seiners from 1940 to 1970s
 - Modern trawlers since late 60s – Danish seiners only Lakes Entrance
 - Significant effort increase in the 1980s
 - Unitisation introduced mid 1980s
 - ITQs introduced for gemfish in 1988, orange roughy in 1990 and a further 15 species in 1992
 - About 140 vessels in the early 1990s => now around 50
- **Great Australian Bight trawl**
 - Fishing began in the early 1900s, but very limited fishing until the late 1980s.
 - ITQs for deepwater flathead, orange roughy and bight redfish introduced in 2006
 - 11 boats operated in 2006-07

Brief History

- **Shark**

- Initially a longline fishery for school shark in early 1900s
- Gillnets took over as the main fishing method in the 1970s
- Fishery was managed with gear restrictions
- ITQs for school and gummy introduced in 2001

- **Non-trawl**

- Originally dropline for blue-eye trevalla and gillnets (eg blue warehou) for scale fish late 1980s early 1990s
- Traps introduced for ling in late 1990s
- Now almost entirely demersal auto longlines for ling and blue eye trevalla

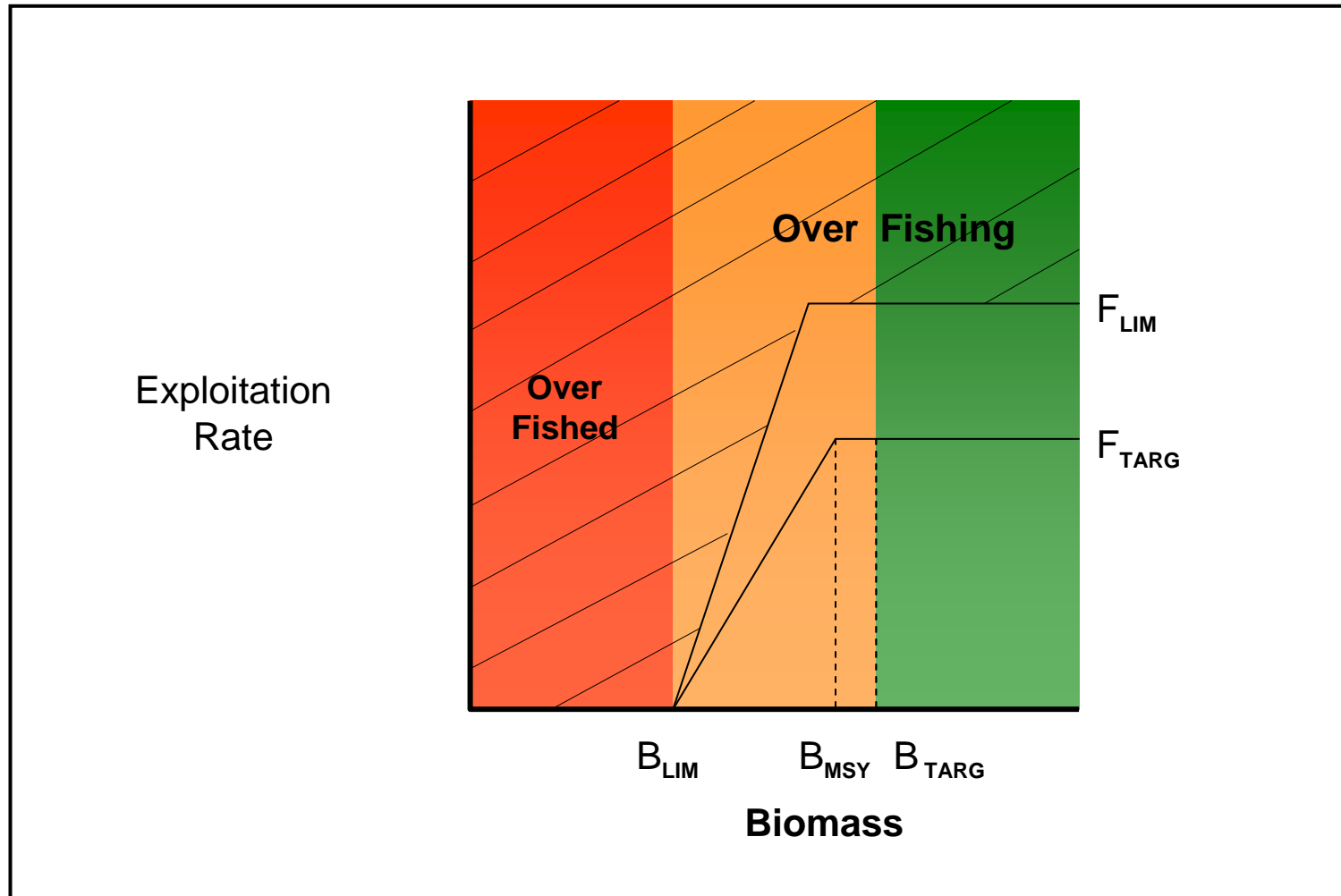
Recent developments in the SESSF

- **Ministerial Direction to AFMA in 2005**
 - cease overfishing and enable the recovery of overfished stocks
 - avoid further species from becoming overfished
 - manage the broader environmental impacts of fishing
 - development and implementation of a harvest strategy policy (HSP)
 - managing fisheries using output controls
 - enhancing fishery monitoring systems
 - introducing spatial closures and Marine Protected Areas (MPAs)
 - conducting fisheries independent surveys
 - strengthening economic and scientific advice.
- **Securing our fishing future \$220 million structural adjustment package**

Australia's Harvest Strategy Policy

- Introduced in 2007 – cease overfishing, rebuild overfished stocks
- Harvest Strategy – pre-specified monitoring, assessment and **control rule**, where the control rule explicitly links the management action to the biological and economic status of the fishery
- Core elements
 - maintain fish stocks at B_{MEY} (proxy = $1.2 \times B_{MSY}$)
 - ensure fish stocks remain above B_{LIM} (proxy = $0.5 \times B_{MSY}$)
 - ensure fish stocks stay above B_{LIM} at least 90% of the time
 - Proxy $B_{MSY} = 40\%$ of unfished levels (B_{40})
- Challenge is to reconcile the need for specific risk-related objectives given the reality of the available data/assessments for data-poor species/fisheries

Australia's Harvest Strategy Policy



Data and assessment used at each Tier

- Tier 1: all available data used in an integrated assessment (e.g. Stock Synthesis – SS2 – see Methot 1f2)
- Tier 3: catch at age data used in “catch curve” analysis to determine current fishing mortality rate F
- Tier 4: catch per unit effort CPUE used directly in HCR; no formal assessment

Used to calculate recommended biological catch (RBC)

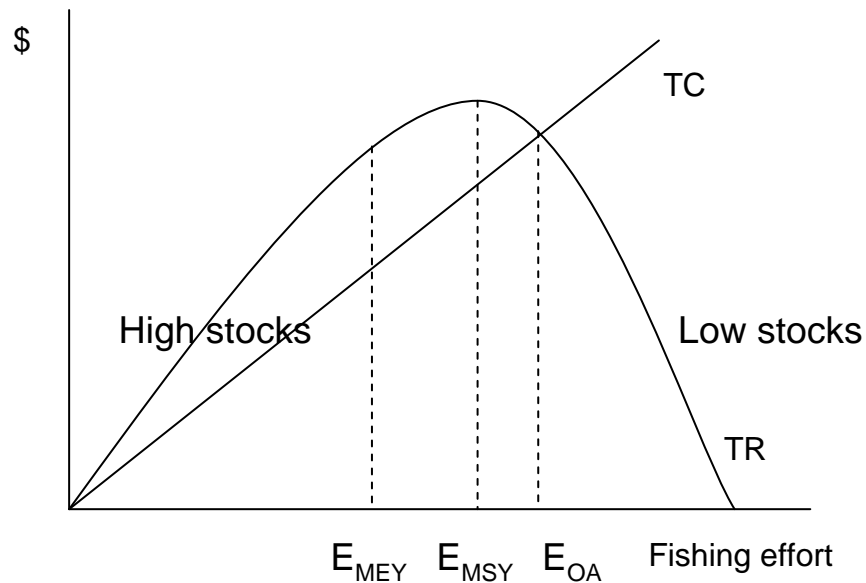
$$\text{TAC} = \text{RBC} - \text{discards} - \text{state catches}$$

RBC discounted relative to Tier 1

- Tier 3, 5%; Tier 4, 15%
- Explicit catch risk cost trade-off

MEY and the HSP

- MEY is the harvest (or effort) level that maximises the NPV of future fishery profits
- B_{MEY} is the associated steady state biomass level
- Use estimates of MEY where available, otherwise use proxy of $B_{MEY} = 1.2B_{MSY}$



Bioeconomic modelling

- In the SESS, a preliminary bioeconomic model has been developed for some species in the Commonwealth trawl and Gillnet, Hook and Trap sectors.
- Model output includes estimates of:
 - The ratio of B_{MEY} to B_{MSY}
 - Steady state TACs at B_{MEY}
 - Initial TACs to rebuild (or fish down) the stock to target level
- However, model is only preliminary and only flathead B_{MEY} estimate used for TAC setting
 - All other species use proxy of $MEY = 1.2B_{MSY}$
- Modelling also being developed to analyse the impact on profits of different TAC trajectories for fishing down and rebuilding stocks => GAB trawl

Bioeconomic model output

| species | stock at MEY/stock at MSY | catch in 2004 tonnes | long run TAC a tonnes | optimal initial TAC tonnes |
|---------------------------------|---------------------------------|----------------------------|-----------------------------|-------------------------------------|
| Orange roughy (eastern) | 1.15 | 600 | 703 | 520 |
| Orange roughy (Cascade Plateau) | 1.47 | 1 600 | 995 | 665 |
| Spotted warehou | 1.08 | 4 100 | 4 117 | 3 114 |
| Ling (trawl only) | 1.29 | 1 073 | 1 397 | 914 |
| Flathead | 1.03 | 3 200 | 3 850 | 2 980 |
| Blue grenadier: 'normal year' | 1.25 | 132 | 9 000 | 6 590 |
| 'shooting year' | | | 10 450 | 7 650 |

Source: Kompas and Che (2007).

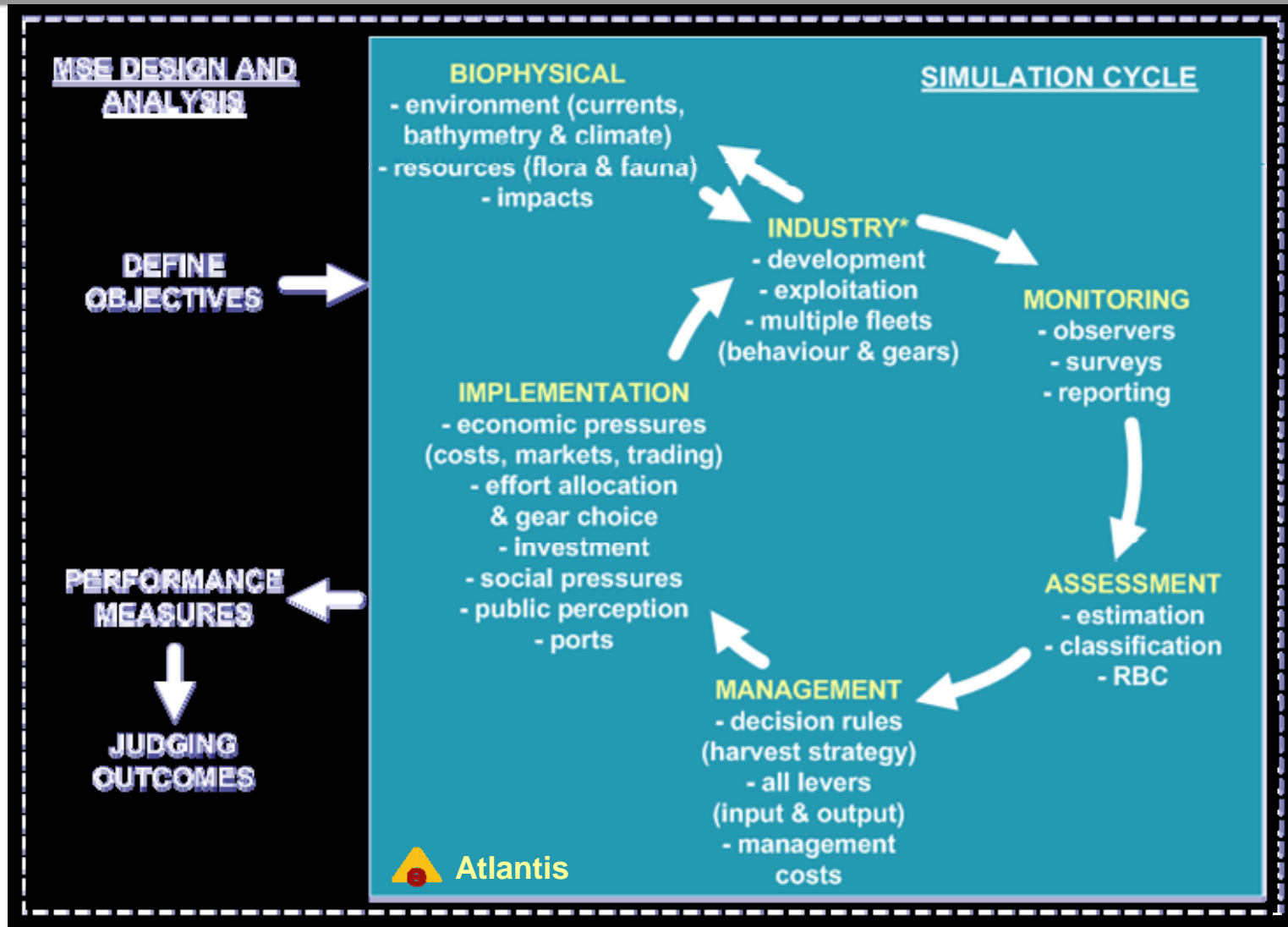
Structural adjustment

- As a part of the Ministerial Direction, \$220 million 'Securing our Fishing Future Structural Adjustment Package'
 - \$150 million Business Exit Assistance
 - Onshore component
 - Levy subsidy
 - Research funds
 - Completed in late 2006
- In the SESS, significant amount of concessions purchased by Government (see table)
- Since the buyout:
 - catch rates have improved
 - average catch per boat has increased
 - total level of effort fallen
 - quota prices increased
 - net economic returns have increased

Buyout results - SESS










| Type of concession | Concessions prior to buyback | Concessions surrendered (both rounds) | % reduction |
|------------------------------------|------------------------------|---------------------------------------|-------------|
| | no. | no. | % |
| Shark Hook Boat SFRs | 30 | 17 | 57 |
| Victorian Coastal Waters Permit | 51 | 28 | 55 |
| Scalefish Hook Boat SFRs | 122 | 63 | 52 |
| Trawl Boat SFRs | 118 | 59 | 50 |
| Tasmanian Coastal Waters Permit | 82 | 38 | 46 |
| East Coast Deepwater Permit | 18 | 8 | 44 |
| SA Coastal Waters Permit | 41 | 17 | 41 |
| Trap Permit / Auto Longline Permit | 20 | 8 | 40 |
| Gillnet Boat SFRs | 88 | 26 | 30 |
| Royal Red Prawn Quota SFR | 485,394 | 103,296 | 21 |
| Redfish Quota SFR | 586,720 | 112,822 | 19 |
| Silver Trevally Quota SFR | 538,740 | 74,912 | 14 |
| John Dory Quota SFR | 235,784 | 30,889 | 13 |
| Jackass Morwong Quota SFR | 1,480,633 | 114,872 | 8 |

AMS, MSE & Atlantis

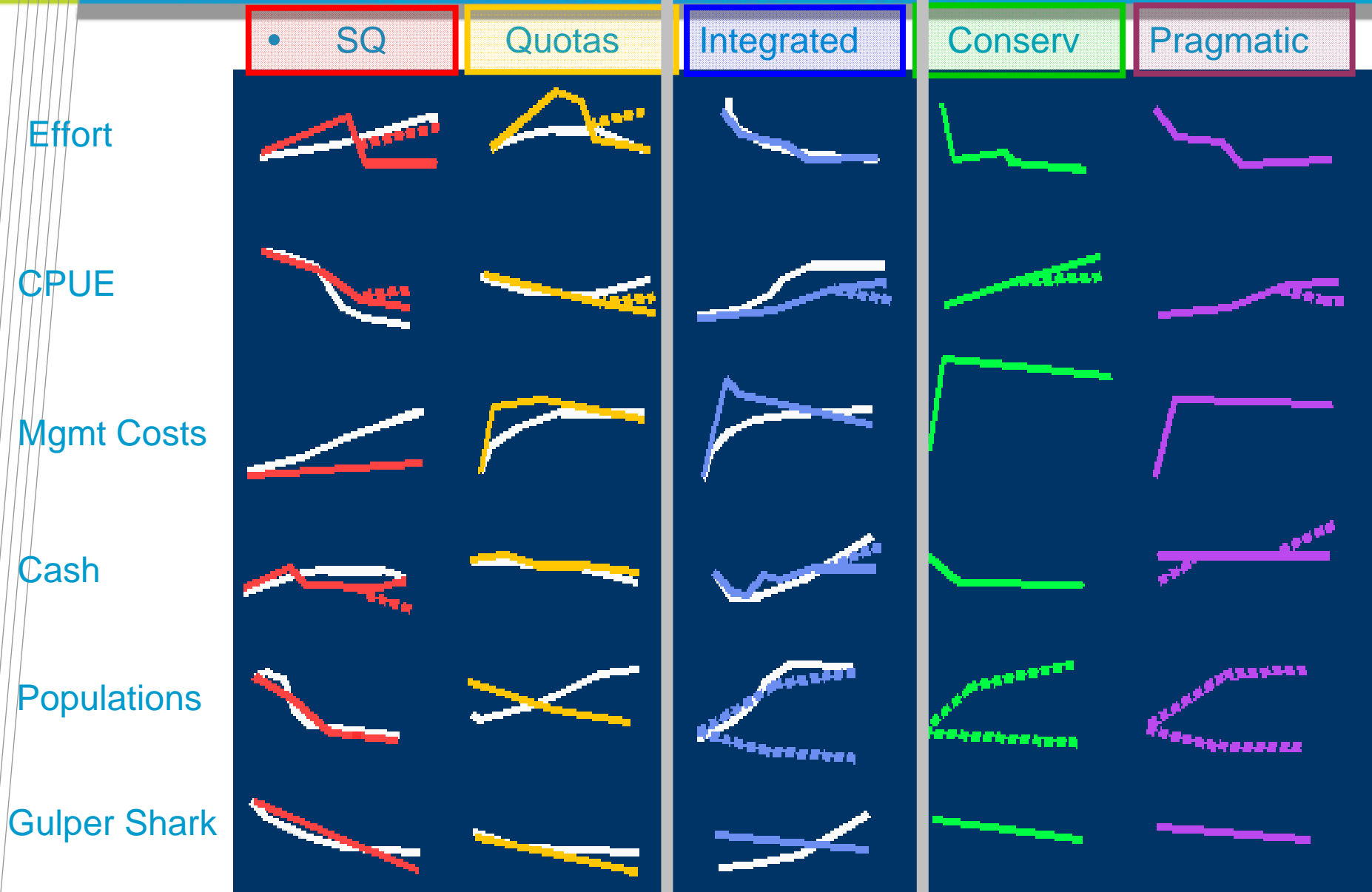


* Representation of run-off, pollutants and habitat degradation also possible

MSE output – decision table

| | Economic objective | Ecological objective | Social objective |
|------------|--|---|---|
| Strategy 1 |  |  |  |
| Strategy 2 |  |  |  |
| Strategy 3 |  |  |  |

Qualitative vs Quantitative



Scenario Summary

- **Status Quo** - effort high, push into marginal areas until economic collapse; shift in targeting to extreme trophic levels, system and public opinion collapses
- **Quota on Everything** - effort high until fleet adjust (economically driven); deepwater unprofitable so shift to shelf; overcatch issues; trawl benefits most
- **Integrated Management** – fleet readjust quickly; footprint concentrated on hot-spots; byproduct quota critical; discarding issues; gear switching not common; good all-round
- **Conservation Driven** - closures very restrictive; strong recovery; significant industry and human cost
- **Pragmatic Reality** - ban on discards has large implications (grounds, constraining byproduct TAC, discontinuity in indicators, product quality, volume of trades); patchy success

AMS Key Points

- More variability between sectors & species than qualitative AMS suggested
- None best over all, but integrated consistently “pretty good”
- Tradeoffs
 - conservation and economics
 - short term costs vs long term pay-off
 - as things “go bad” move shallower again
- Twists
 - long recovery times for some groups (e.g. gulper shark)
 - multispecies (trophic etc) impacts (bigger on shelf)
 - small boats = most heavily impacted (lack behavioural flexibility)
 - “getting around” quota system (so need integration)

Conclusions

- HSP has provided much more rigour and transparency in decision making
- ITQs will not solve all your problems by themselves
 - Crucial that appropriate TACs are also set
 - Other management controls are also required (e.g. mesh sizes, area closures etc.)
- Buyout appears to have been successful
 - BUT only successful as it was associated with some significant management changes

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Thank you

Contact Us

Phone: 1300 363 400 or +61 3 9545 2176
Email: enquiries@csiro.au Web: www.csiro.au

