FRDC 2022-006: Developing a harvest control rule to use in situations where depletion can no longer be calculated relative to unfished levels

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Project background

- The project was developed following the last School Shark assessment in 2020
- The assessment used CKMR data to provide an index of absolute abundance
- The CKMR assessment concluded the population size was smaller than suggested by previous assessments

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School Shark assessment outcomes

- The CKMR assessment also highlighted inconsistencies between historical catch records and numbers of individuals
- Data suggests that pupping regions in Port Phillip and Western Port Bays have been significantly degraded

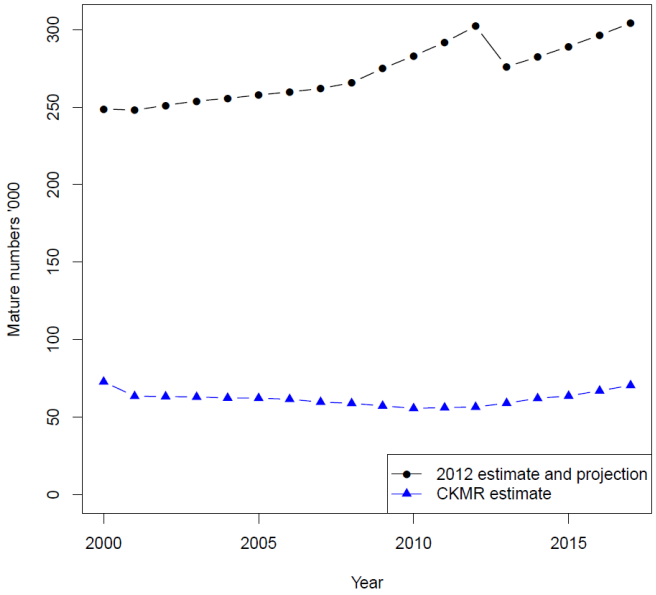

Figure 4.20: Numbers of mature School Shark (females aged 11 and over plus males aged 7 and over) for the full stock assessment model's base case that assumed catches of 225t after 2011 (2012 estimate and projection; black line) and base case close kin model estimate (blue line).

From Thomson et al. 2020

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The relevance of B_0

- The degradation of School Shark pupping grounds has meant that the stock assessment estimate of B_0 no longer relates to the current population structure
- The concept of B_0 is also under scrutiny more broadly with impacts of climate change impacting fish stocks

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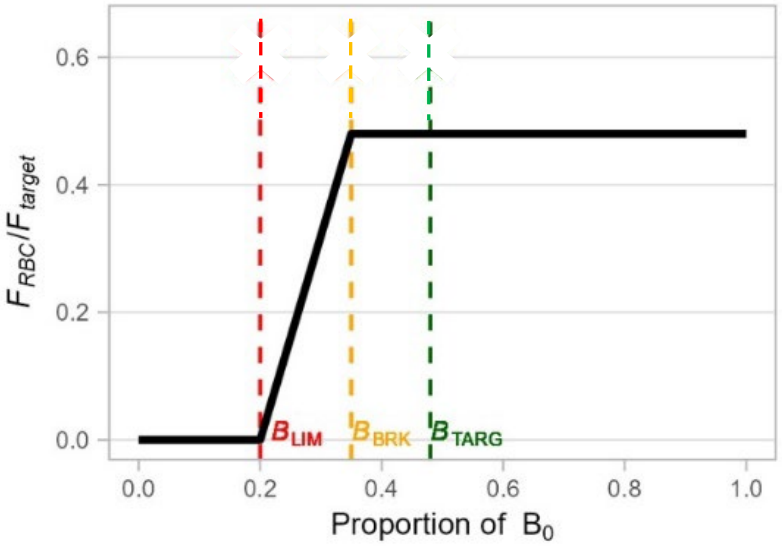
B_0 management implications

- Stock status is a key input to many HCRs
  - It is required for the standard SESSF Tier 1 HCR
- Stock status requires information on current stock size relative to that estimated before fishing (B_0)



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What HCR to use when we no longer have a reliable estimate of B_0

- The aim of this project:
  - Develop a harvest control rule for the SESSF (and beyond) that can be used without a measure of B_0

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Project team

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Robin Thomson

Mark Bravington

Laura Tremblay-Boyer

Keith Sainsbury

Paul Burch

Geoff Tuck

Project objectives

- Review currently available HCRs that could be used in this scenario
- Trial how well these HCRs perform and tune these as necessary to optimise their performance in the SESSF (this process might include the proposal of new methods)
- Provide examples of how suitable HCRs perform for a generic SESSF teleost and a shark species (School Shark)

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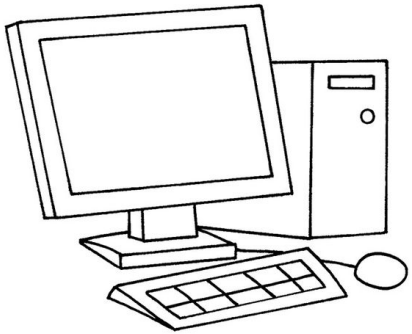
Project progress

Progress to date:

- Literature review complete
- CKMR model developed in TMB – testing is underway
- Candidate HCRs identified
- MSE code development underway

To do:

- Code HCRs
- Finalise model and MSE development
- Complete simulations
- Interpret results
- Provide recommendations for management



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Candidate HCRs

- The project is focusing on *F*-based HCRs
- CKMR data overcomes some of the traditional challenges associated with these HCRs as it provides total mortality rates and absolute abundance measures

- 3 Types of *F*-based HCRs
  - Natural mortality rate (e.g. $F=M$)
  - Yield (e.g. F_{MSY})
  - Per-recruit measures (e.g. $F_{30\%}$)

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Summary

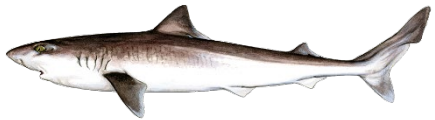
- There is a clear need to develop and test a HCR that does not require estimates of B_0
- This project will develop an alternative, tested, HCR
- This will facilitate the catch setting process for School Shark as an initial case, while meeting the needs of the harvest strategy policy

Australian Government
Department of Agriculture and Water Resources

Commonwealth Fisheries Harvest Strategy Policy

Framework for applying an evidence-based approach to setting harvest levels in Commonwealth fisheries

Second Edition



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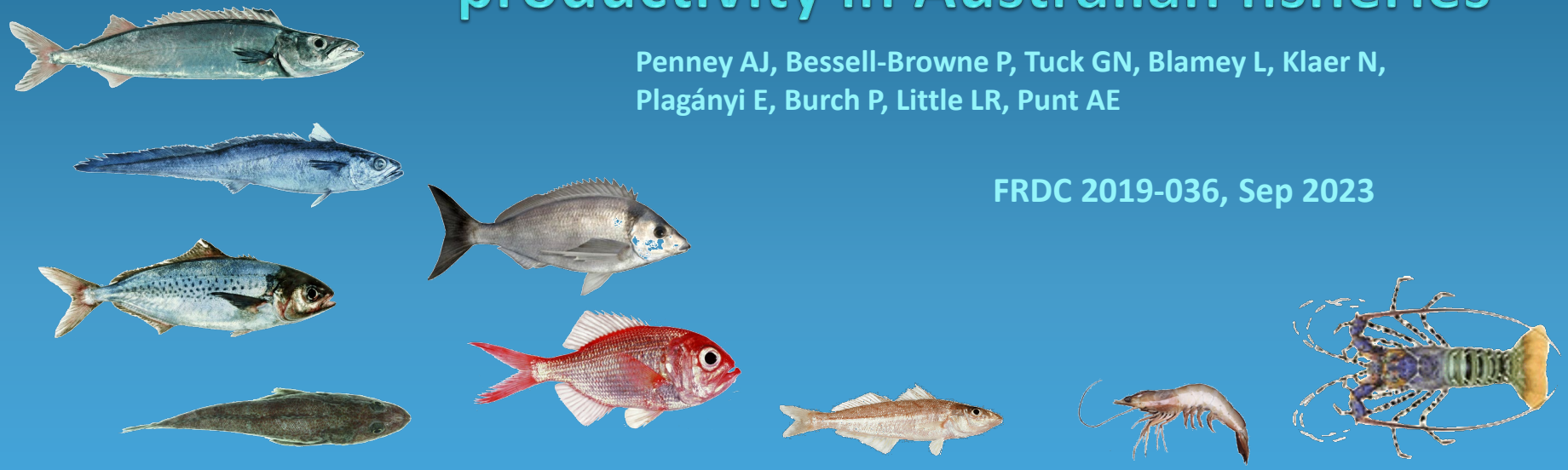
Implementation of dynamic reference points and harvest strategies to account for environmentally-driven changes in productivity in Australian fisheries

Penney AJ, Bessell-Browne P, Tuck GN, Blamey L, Klaer N, Plagányi E, Burch P, Little LR, Punt AE

FRDC 2019-036, Sep 2023



Overview of the project

- The need for a project to evaluate use of dynamic reference points was identified by the Australian Fisheries Management Authority Southeast Trawl Resource Assessment Group in 2018.
- This was driven by non-recovery and evidence of sustained below-predicted recruitment for several south-eastern trawl stocks: Jackass Morwong, Silver Warehou, Redfish, Gemfish.
- The project has had four components:
  - Evaluation of various lines of evidence of non-fishing vs. fishing effects, all based on results of Tier 1 assessments.
  - Retrospective analyses of historical trends in dynamic B_0 and status in relation to dynamic reference points.
  - Simulation analyses of effects on stock size of environmentally-driven changes in recruitment, growth or M*.
  - Management strategy evaluation of alternative HCRs (static, dynamic, dynamic with floor) under cyclical or persistent decline in recruitment.

(* Bessel-Browne *et al* 2022. *The effects of implementing a 'dynamic B_0' harvest control rule in Australia's Southern and Eastern Scalefish and Shark Fishery*)

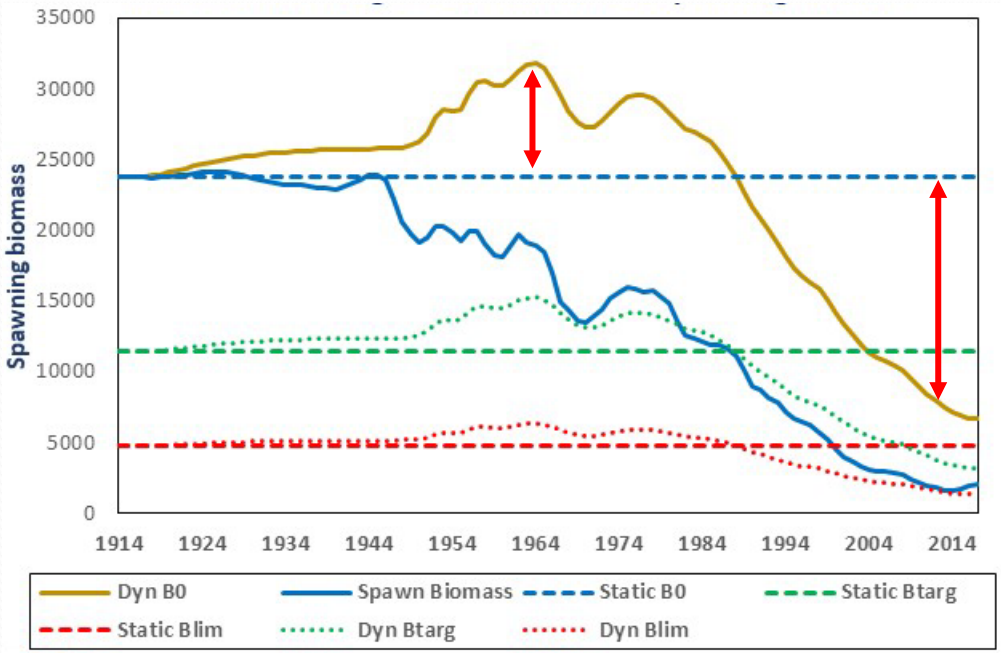
Use of B_0 and reference points in harvest control rules

- Target and limit reference points used in harvest control rules are traditionally based on B_0, the level of biomass that the stock would be expected to attain (on average) if left unfished for a long time, or the estimated biomass before fishing started (e.g. 48% B_0 target and 20% B_0 Limit).
- This assumes that productivity of the stock (growth, recruitment, natural mortality) always fluctuates around some average level, and that this level of B_0 would always be attained if left unfished, i.e. B_0 is 'static'.
- In reality, productivity varies in response to environmental conditions – recruitment varies depending on adult and larval food availability, water temperature, current patterns, egg and larval survival, predation, etc.
- Where there is a long-term trend or persistent change in any one of these productivity parameters, the level the stock would attain if left unfished changes, so that B_0 is not static and may not be appropriate for calculating reference points.

What is Dynamic B_0 ?

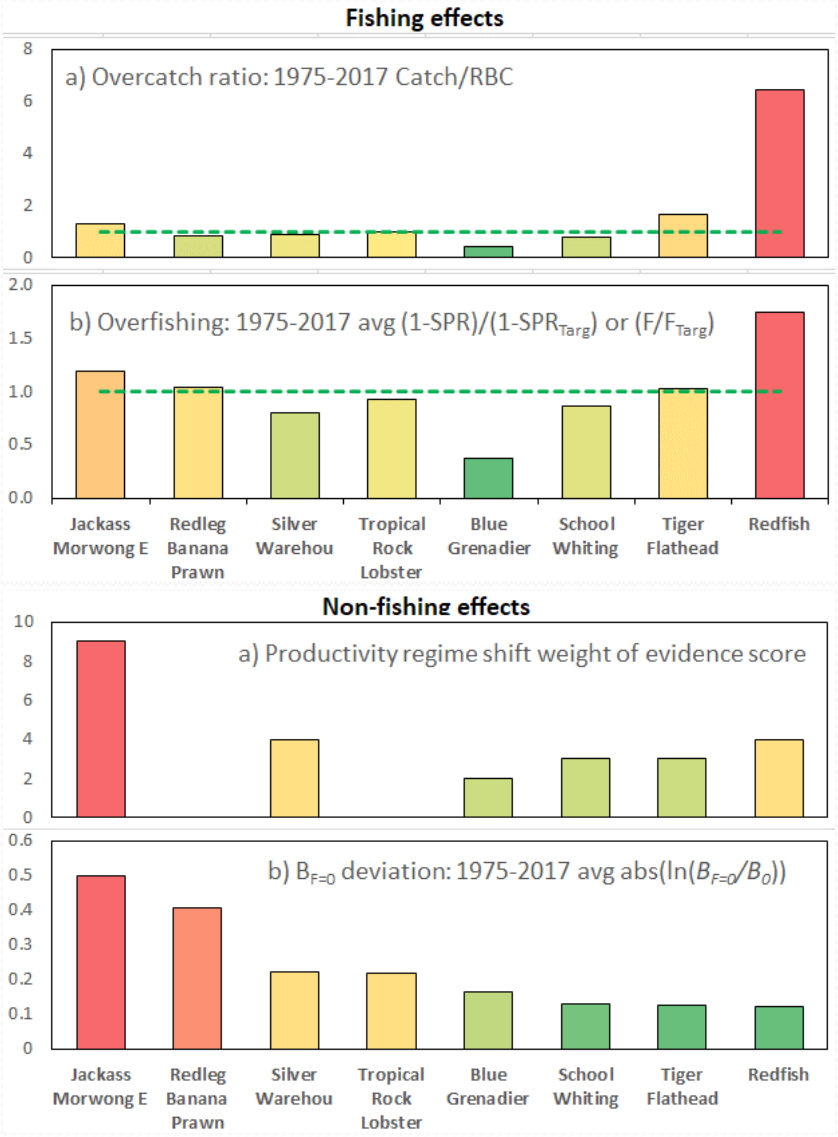
- **Dynamic B_0** ($B_{Unfished}$ or $B_{F=0}$) is the biomass that would be attained if a stock is unfished, when environmental (non-fishing) effects have resulted in persistent change (decrease or increase) in productivity.
- This is calculated in assessment software (like *Stock Synthesis*) by removing all catches from the assessment, assuming that all other productivity parameters (growth, natural mortality and recruitment deviations) remain as they were estimated in each year by the assessment run with the catches.
- Dynamic reference points are Targets and Limits calculated using the Dynamic B_0, rather than static B_0. As Dynamic B_0 goes up or down, so too do the reference points, proportionally.
- A similar approach has already been implemented for Jackass Morwong East, in the form of an assumed one-step regime shift, with B_0 decreasing by ~70% in 1985. In fact, the decline in productivity has been occurring since ~1965.

Comparison of Static and Dynamic B_0 – *Jackass Morwong East*



- Static B_0 for the eastern stock of Jackass Morwong East was estimated in the 2018 assessment to be ~23,800t.
- Estimated $B_{F=0}$ increased from the B_0 level to ~31,900t in 1964, and then declined markedly to only ~6,650t by 2017.
- Estimated spawning biomass tracked B_0 until 1945 and then decreased markedly to ~1,650t in 2014, only 7% of the pre-regime shift static B_0, but ~23% of the $B_{F=0}$ level.
- The deviation of $B_{F=0}$ from B_0 (↕) indicates a non-fishing effect on unfished biomass.

Evidence for fishing and non-fishing effects

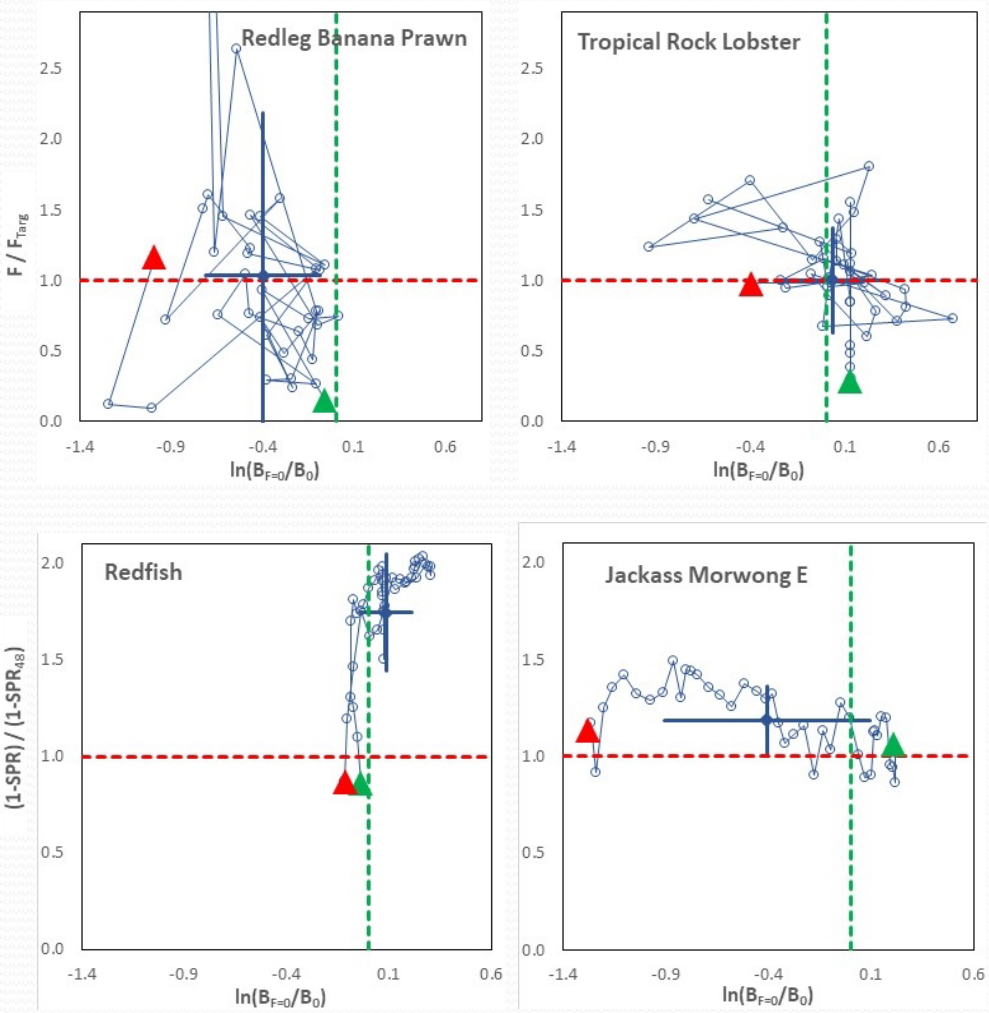


Many lines of evidence were evaluated for fishing and non-fishing effects:

- Only Redfish has been subject to substantial over-catch.
- Redfish is also the only stock that has been subject to consistent overfishing. There has been recent moderate over-fishing of Jackass Morwong East due to unavoidable by-catches when the RBC = 0.
- Jackass Morwong shows the highest non-fishing effects, along with Redleg Banana Prawns.
- Silver Warehou and Tropical Rock Lobster show moderate non-fishing effects. Blue Grenadier, School Whiting, Tiger Flathead and Redfish show low non-fishing effects.

However, strong fishing effects will mask environmental effects, and *vice versa*.

Relative trajectory plots of fishing and non-fishing effects



1-SPR and Dynamic B_0 deviation trends over time can be combined to produce informative 'relative trajectory' plots that summarise the trends in both effects.

- Redleg Banana Prawn and Tropical Rock Lobster show strong and highly variable non-fishing effects, but with no trend. This results in inter-annual fluctuations in over- and under-fishing of 'strong' and 'weak' year classes.
- Redfish and Jackass Morwong East show the strongest contrast: Redfish shows low non-fishing effects but substantial overfishing.
- Jackass Morwong East shows moderate overfishing but a one-way trip of strong, negative non-fishing effects.

However, strong fishing effects will mask environmental effects, and *vice versa*.

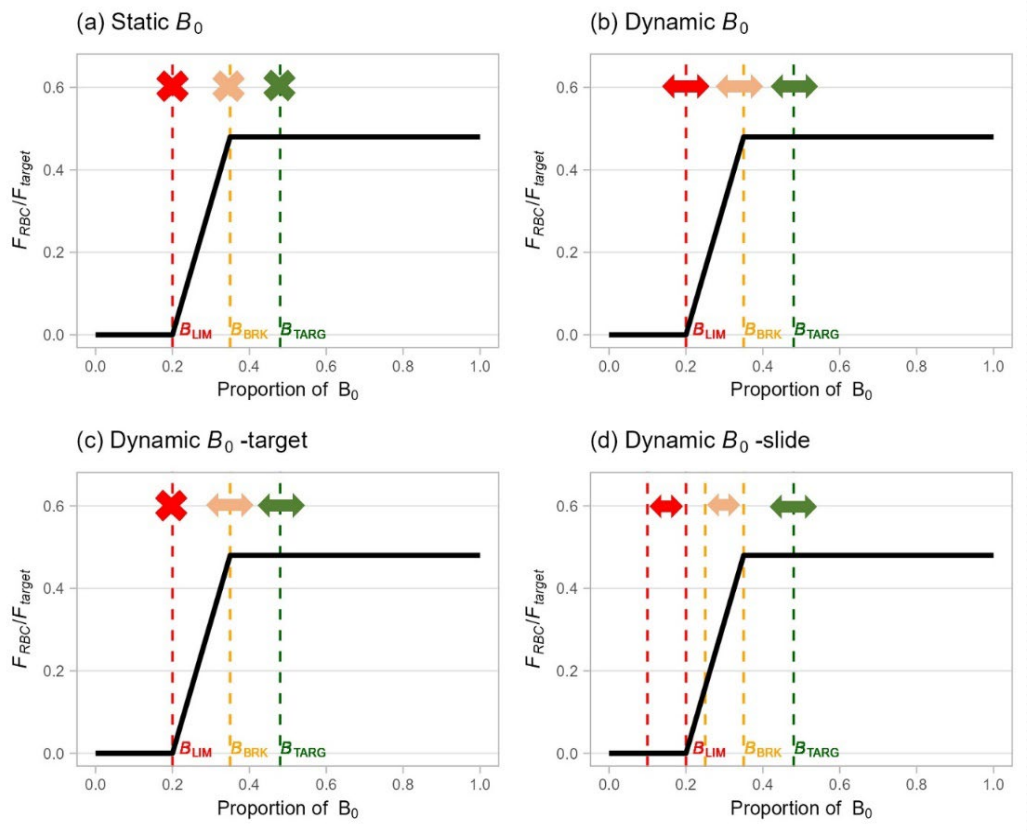
Management strategy evaluation testing of alternative Static and Dynamic harvest control rules

- Four HCRs were MSE tested for the SESSF species, using current reference levels*:

  B_{LIM} = 0.2, B_{BRK} = 0.35, B_{TARG} = 0.48

- Redleg bananas prawns (RBP) tested 3 HCRs (a, b and c) using reference levels:

  B_{LIM} = 0.25, B_{BRK} = 0.5, B_{TARG} = 0.6



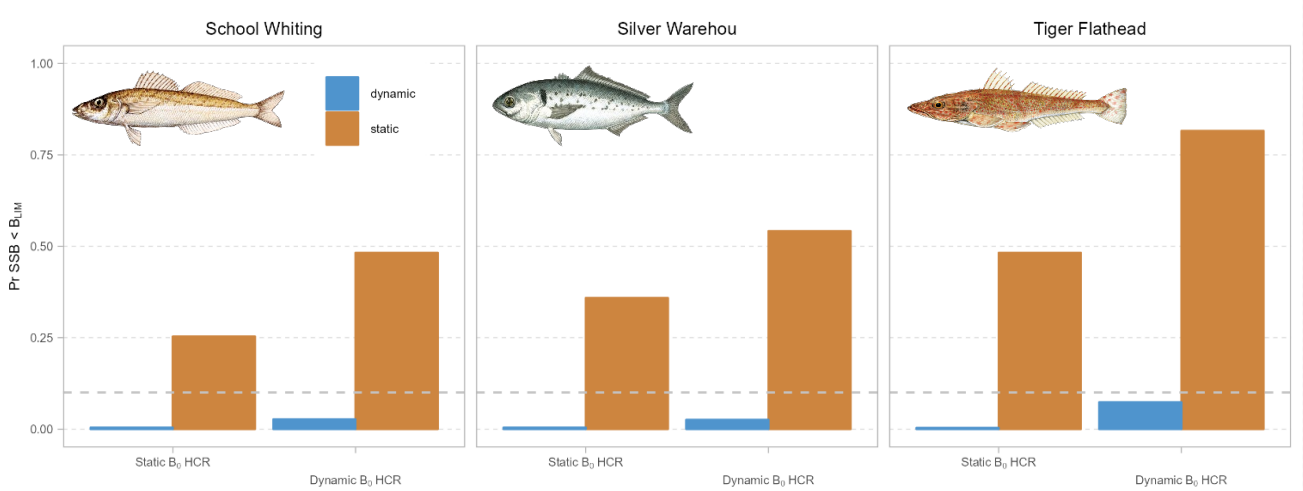
(* Bessel-Browne *et al (in press) Management Strategy Evaluation of static and dynamic harvest control rules under long-term changes in stock productivity: a case study from the SESSF*)

Harvest control rule MSE performance measures

In reduced productivity conditions all species/HCRs have:

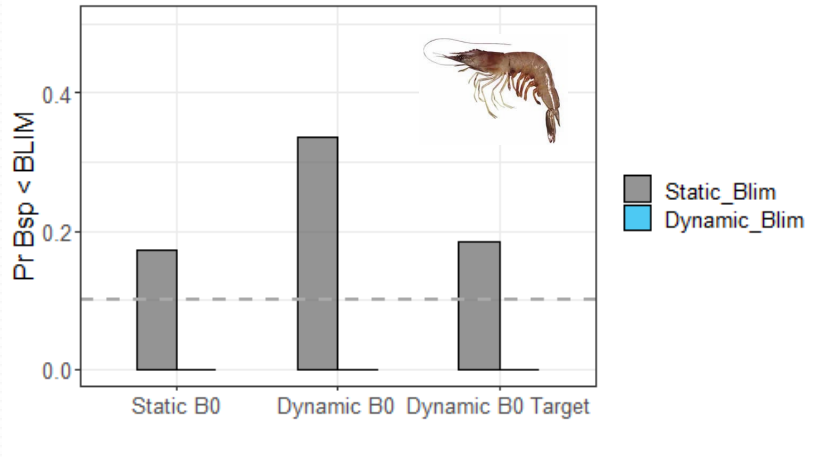
> 10% probability of *SSB* < static B_{LIM}

< 10% probability of *SSB* < dynamic B_{LIM}



In other words, if the stock is now permanently smaller for environmental reasons, the dynamic HCR will manage it safely above the new, lower, limit.

If the reduced productivity is temporary, then using a dynamic HCR could reduce the stock to below the old, static limit.



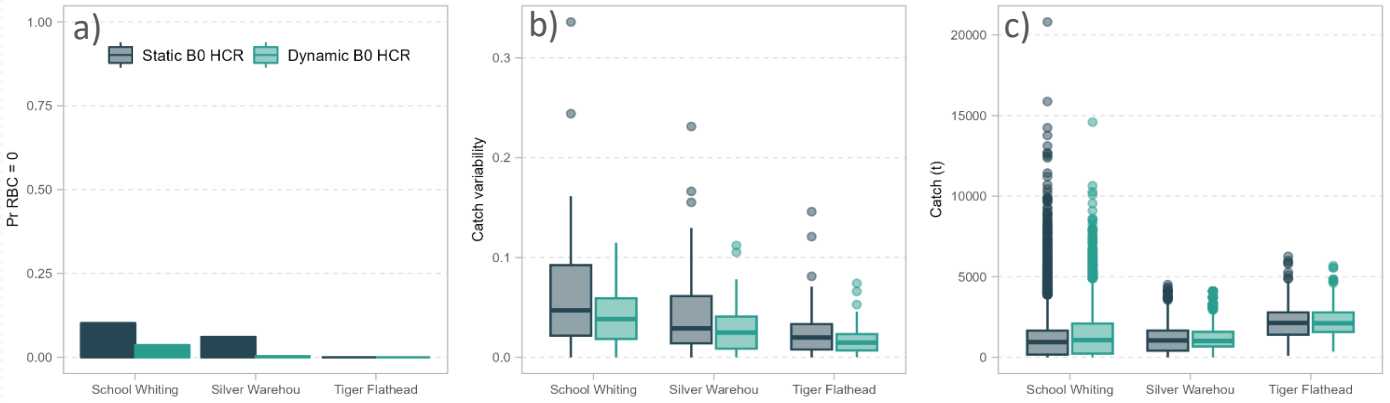
Harvest control rule MSE performance measures

a) The probability of catch = 0 is species and depletion dependent. For species between the B_{Brk} and B_{Lim} ref points, a dynamic HCR has a lower probability of catch = 0.

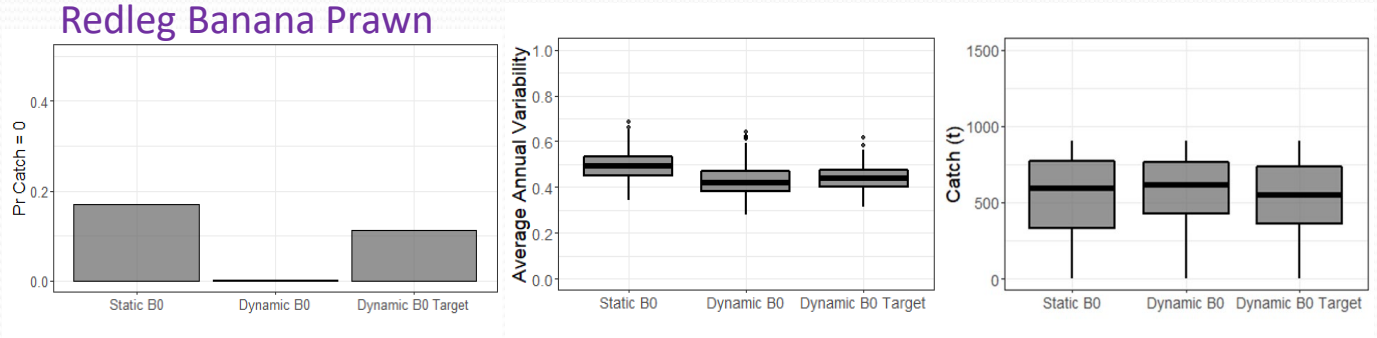
b) When stocks are between the B_{Brk} and B_{Lim} ref points, catches are more variable, and slightly lower, with a Static B_0 HCR. Catches are slightly higher, and less variable, with a Dynamic B_0 HCR.

c) The actual difference in catches across HCRs are relatively minor, again depending on depletion.

SESSF species



Redleg Banana Prawn



Key conclusions

- There are many lines of evidence that can be analysed if there is a Tier 1 assessment with robust estimates of recruitment deviations. These require annual age-composition data to estimate annual recruitment. Similar analyses could be done using an age-structured production model able to estimate annual deviations in production.
- Evidence indicates a wide range in fishing and non-fishing effects. Many stocks are environmentally affected, but without a persistent trend. Fewer stocks have shown persistent negative trends in non-fishing effects, but these include the non-recovering stocks of most concern: Jackass Morwong, Silver Warehou, Redfish.
- Results of simulations and MSE evaluation are as expected: application of Dynamic B_0 HCRs, when the stock is below the breakpoint in a HCR, results in slightly higher catches and a low probability of fishery closure, using the lower reference points. A Static B_0 HCR results in higher probability of fishery closure, and slightly lower catches.
- If environmental effects are temporary, and productivity will revert to previous levels, then use of a Static B_0 HCR would be more appropriate to maximise unfished biomass.
- The appropriate approach is a management choice and depends on evidence that stocks have been environmentally affected and will remain at a lower productivity level for an extended period.

SESSF
Multi-species Harvest Strategy

The Multi-species harvest strategy project

Background and summary

FRDC webinar

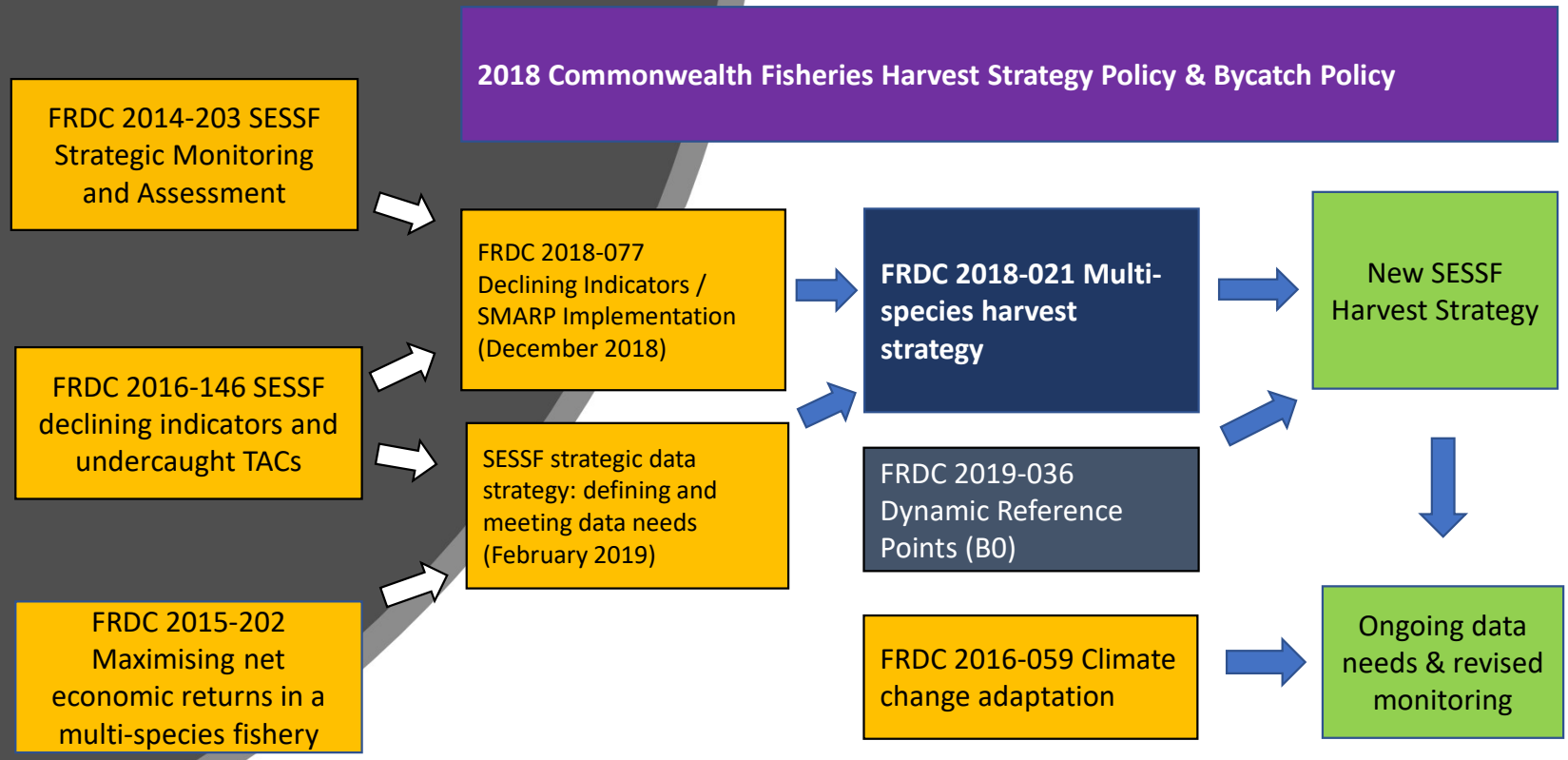
December 2023

Team

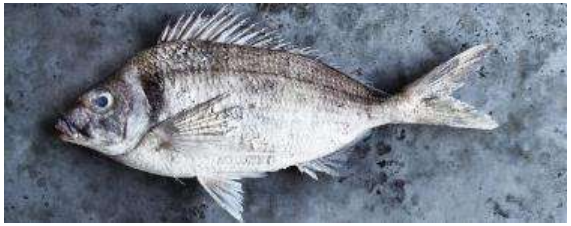
- Andre Punt
- Paul Burch
- Pia Bessel-Browne
- Keith Sainsbury
- Sean Pascoe
- Trevor Hutton
- Beth Fulton
- Florence Briton
- Javier Porobic
- Ian Knuckey
- Andrew Penney
- Dan Corrie
- Robin Thomson
- Geoff Tuck
- David Smith
- Sandra Curin

How we got here

SESSF
Multi-species Harvest Strategy

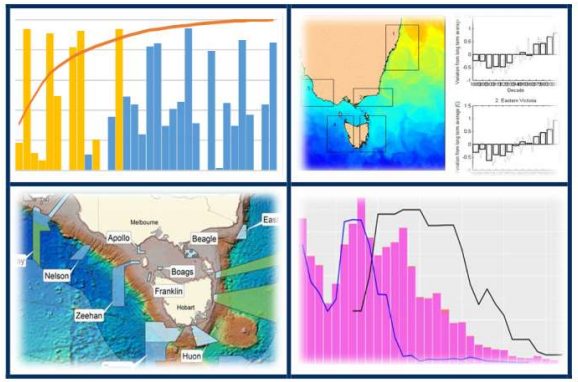


Motivation



SESSF
Multi-species Harvest Strategy

Understanding factors influencing under-caught TACs, declining catch rates and failure to recover for many quota species in the SESSF



Ian Knuckey, Simon Boag, George Day, Alistair Hobday, Sarah Jennings, Rich Little, David Mobsby, Emily Ogier, Simon Nicol and Robert Stephenson

2018

FRDC Project No 2016-146

Declining Indicators project

- **Undercaught TACs**
- **Declining Abundances or Apparent Abundances (i.e. CPUEs)**
- **Non-recovering stocks**

Hypothesis	Recommendation
TACs too high - incorrect reference points	Consider setting economic **targets only for key economic species** in the fishery.
Interactions/ choke species	Consider harvest strategy settings to **avoid the risk of recruitment failure for secondary and byproduct species**
Not capturing changing behaviour in CPUE standardisation (avoidance, market fishing, quota market influences)	Recognise **that targeting is now focussed on key economic driver species**.
Costs of production - Fish sale prices and changing markets	Consider setting **economic targets for only the key economic species** in the fishery (recognising that these target species may change over time).
Climate change / regime shift	Possible survey to understand what has changed in ecosystem

SESSF
Multi-species Harvest Strategy

Multi-species Harvest Strategy Project

The Multi-species harvest strategy project

Objectives

1. To **develop** and evaluate multi-species harvest strategies, including reference points and decision rules.

2. To **evaluate** future monitoring and assessment options identified in the
   - SESSF Monitoring and Assessment Research project
   - Declining Indicators project

3. To develop a process and set of design principles for multi-species harvest strategies.

Reminder: What is a Harvest Strategy?

A formal process for setting catch limits

- Operational management objectives
- Monitoring, data collection program
- Analysis / assessment procedures
- Decision rule (harvest control rule)

Harvest strategies for single-species fisheries straight forward:

- Determine sustainable catch / effort level to achieve objective for that species

Problem

- **Many species**
- **Technical + other interactions**

SESSF multi-gear, multi-species fishery
Harvests over 100 different species
TACs for over 30 species / species groups

Project History

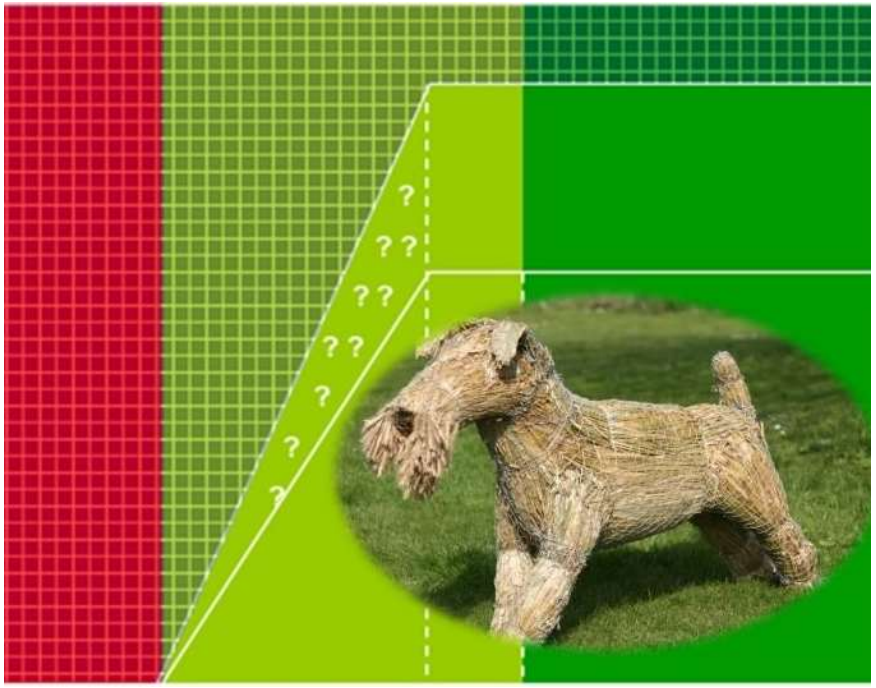
SESSF
Multi-species Harvest Strategy

- Feb 2019 (Canberra)
  - Implementation plan for Declining Indicators project
  - Develop initial set of candidate multi-species harvest strategies
- Nov 2019 Steering committee (virtual)
- Aug 2019 (Hobart)
  - Present straw dog strategies
- ~~March 2020 stakeholder workshop (Canberra)~~
- Aug 2020 Steering committee (virtual)
- ~~March 2021 stakeholder workshop (Canberra)~~
- April 2021 Steering committee (virtual)
- ~~June 2021 AFMA workshop (Canberra)~~
- March 2022 Inter-agency Consultation workshop (Canberra)
- June 2022 Steering Committee

The approach

Aug 2019 Design workshop (Hobart)

- Conducted 10 international interviews
- Considered a wide range of possible approaches = **Straw dogs**
- Across a range of Harvest Strategy criteria



Straw Dog	Data	Analysis	HCR	Multi-spp	Flexibility	Cost
1 SMARP						
2 US ecosystem						
3 Indicator species						
4 Pretty good MS Yield						
5 EBFMP						
6 Priority close kin						
7 Priority FIS						

Comparison of the Straw Dogs

Best criterion for each Straw Dog option highlighted

Straw Dog	Data	Analysis	HCR	Multi-spp	Flexibility
1 SMARP					
2 US ecosystem					
3 Indicator species					
4 Pretty good MS Yield					
5 EBFMP					
6 Priority close kin					
7 Priority FIS					
Grand Total					

Comparison of the Straw Dogs

Best Straw Dog option for each criterion highlighted

Straw Dog	Data	Analysis	HCR	Multi-spp	Flexibility
1 SMARP					
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7 Priority FIS					
Grand Total					

Comparison of the Straw Dogs

Straw Dog	Data	Analysis	HCR	Multi-spp	Flexibility	Total
1 SMARP	3.18	3.00	2.94	0.65	0.59	2.07
2 US ecosystem	2.25	2.94	2.69	3.75	2.06	2.74
3 Indicator species	3.13	4.00	3.13	3.75	2.63	3.33
4 Pretty good MS Yield	4.33	4.20	4.33	3.87	1.80	3.71
5 EBFMP	3.20	2.33	0.87	4.20	2.80	2.68
6 Priority close kin	4.59	4.76	2.47	0.76	3.47	3.21
7 Priority FIS	4.63	3.63	1.75	1.13	3.31	3.14
Grand Total	3.62	3.56	2.60	2.53	2.38	2.94

Comparison of the Straw Dogs

Straw Dog	Data	Analysis	HCR	Multi-spp	Flexibility	Total	Cost
1 SMARP	3.18	3.00	2.94	0.65	0.59	2.07	3.53
2 US ecosystem	2.25	2.94	2.69	3.75	2.06	2.74	0.31
3 Indicator species	3.13	4.00	3.13	3.75	2.63	3.33	1.44
4 Pretty good MS Yield	4.33	4.20	4.33	3.87	1.80	3.71	1.53
5 EBFMP	3.20	2.33	0.87	4.20	2.80	2.68	1.20
6 Priority close kin	4.59	4.76	2.47	0.76	3.47	3.21	3.71
7 Priority FIS	4.63	3.63	1.75	1.13	3.31	3.14	4.38
Grand Total	3.62	3.56	2.60	2.53	2.38	2.94	2.34

MSHS project breadth

Challenges

Many Species

Indicator species approach

- Approach 1: Non-assessed species pairing
- Approach 2: Non-assessed species triggered

Technical Interactions

PGMSY

- Based on 2018 fleet structure (metiers)
- Sets targets based on technical interactions in metiers

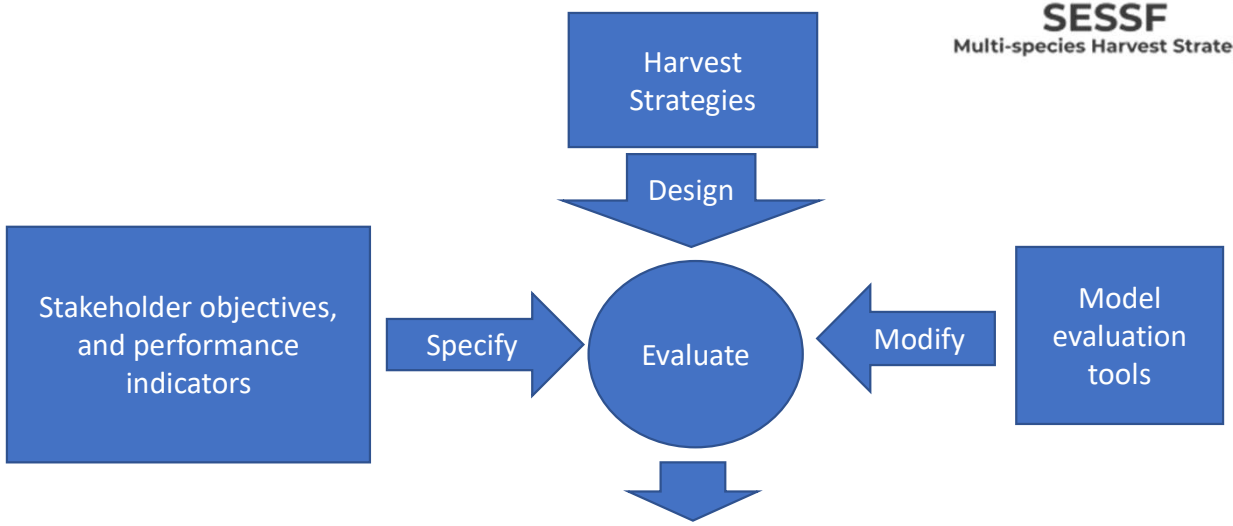
Other ways to effect RBCs

Multi-species BMEY target

- Wide range of targets
- Some species with high targets
- Strongly influenced by economic prices and costs

Project design

SESSF
Multi-species Harvest Strategy



Objective 2	Tool (model) 1	Tool 2	Tool 3	Tool 3
Strategy 1	✗	✓	✓	✗
Strategy 2				

Objective 1	Tool (model) 1	Tool 2	Tool 3	Tool 3
Strategy 1	✓✓	✓	✓	✓
Strategy 2	✓	✓✓	✓	✗

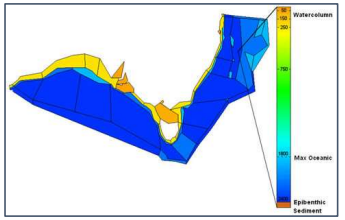
Evaluation tools:

SESSF
Multi-species Harvest Strategy

2 models

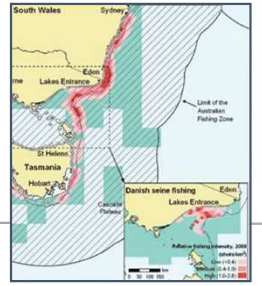
Atlantis

- Multi-species (many)
- Technical interactions
- Trophic interactions (ecological)
- comprehensive



ratpack

- Multi-species (few)
- Technical interactions
- ~~Trophic interactions (ecological)~~
- focused



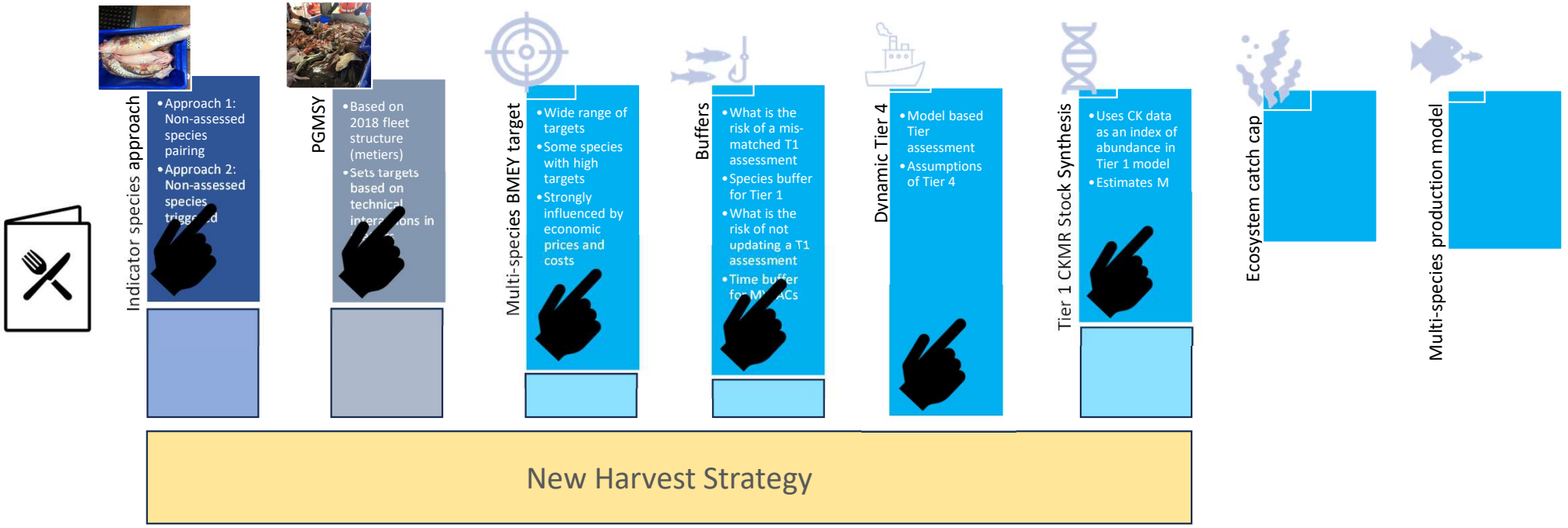
MSHS implementation

1. What features do you want in a new harvest strategy?
2. What additional work needs to be conducted?
3. How do you put them together?

Many Species

Technical Interactions

Other ways to effect RBCs



Metiers: a critical ingredient

A metier is a group of fishing operations targeting a specific assemblage of species, using a specific gear, during a specific season and within a specific area

Fleets
(as in assessments)
Gear + Zone + Season

Gear	Depth zone	Zone	Season	% hauls
Trawl	Shelf	10;20;30	All year	23
	Shelf	10;20;30	All year	24
	Shelf	Ulladulla	All year	3
	Shelf	10;20;30	All year	12
	Shelf	10;20	Except winter	5
	Shelf	20	Summer	2
	Shelf	10	Dec-Jan; April-June	3
	Shelf	10	April-May	2
	Shelf-slope	10;20;30	All year	3
	Shelf-slope	10;20;30	Summer-Autumn	5
	Slope	20	Not in summer	7
	Slope	10	July-Oct	3
	Slope	10;20;30	All year	6
	Slope	10;20;30	Winter	2
	Deep	St Helens	Not in summer	1
Danish seine	Shelf	20	Drop in summer	13
	Shelf	20	Drop in summer	22
	Shelf	20	Spring-Summer	42
	Shelf	20	Drop in summer	12
	Shelf	20	Drop in summer	9

Metiers: a critical ingredient

A metier is a group of fishing operations **targeting a specific assemblage of species**, using a specific gear, during a precise period of the year and/or within the specific area

Fleets
(as in assessments)
Gear + Zone + Season

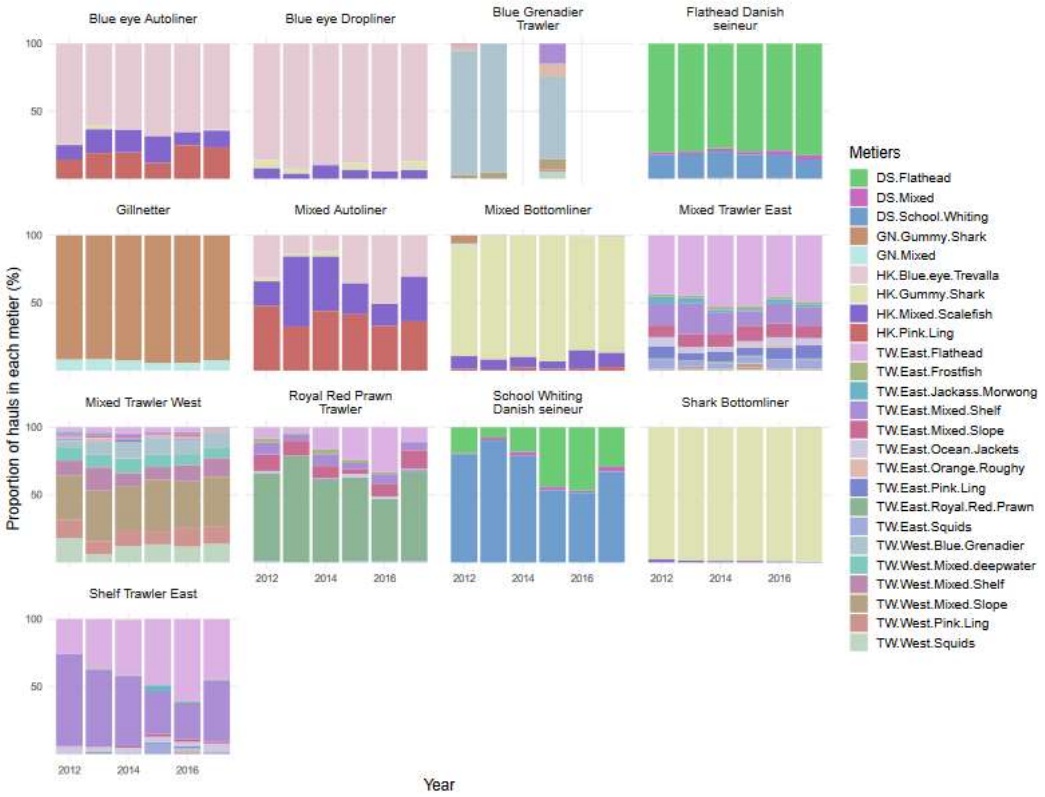
+

Species caught

=

Main spp	Secondary spp	Depth zone	Zone	Season	% hauls	Cluster step 2.2
Flathead (87%)		Shelf	10;20;30	All year	23	Flathead
Flathead (61%)	John dory, squid, latchet, jackets, others	Shelf	10;20;30	All year	24	Flathead
RRP (87%)	Mirror dory, others	Shelf	Ulladulla	All year	3	RRP
	Flathead John dory, squid, others	Shelf	10;20;30	All year	12	Mixed shelf
Ocean jackets (43%)	Flathead, John dory	Shelf	10;20	Except winter	5	Ocean jackets
Morwong (53%)	Flathead, jackets, squid, others	Shelf	20	Summer	2	Morwong
Silver trevally (62%)	Flathead, jackets, others	Shelf	10	Dec-Jan; April-June	3	Mixed shelf
School whiting (57%)	Flathead, others	Shelf	10	April-May	2	Mixed shelf
	Others (65%), flathead, squid	Shelf-slope	10;20;30	All year	3	Mixed (shelf-slope)
Squids (60%)	Flathead	Shelf-slope	10;20;30	Summer-Autumn	5	Squid
Ling (69%)	Ocean perch – offshore, blue grenadier, mirror dory	Slope	20	Not in summer	7	Ling
Ocean perch - offshore (59%)	Ling, mirror dory, gemfish, others	Slope	10	July-Oct	3	Mixed slope
	Blue grenadier, mirror dory, gemfish, others	Slope	10;20;30	All year	6	Mixed slope
Frostfish (60%)	Mirror dory, ling	Slope	10;20;30	Winter	2	Frostfish
Orange roughy (90%)	Oreos	Deep	St Helens	Not in summer	1	Orange roughy
Flathead (48%)	gummy shark, other species	Shelf	20	Drop in summer	13	Flathead
Flathead (85%)		Shelf	20	Drop in summer	22	Flathead
Flathead (98%)		Shelf	20	Spring-Summer	42	Flathead
School whiting (91%)		Shelf	20	Drop in summer	12	School whiting
School whiting (58%)	Flathead, other species	Shelf	20	Drop in summer	9	School whiting
	Other species (72%), school whiting, flathead	Shelf	20	Winter-Spring	2	Mixed

Allocation of fishing effort among metiers at the fleet level between 2012 and 2017

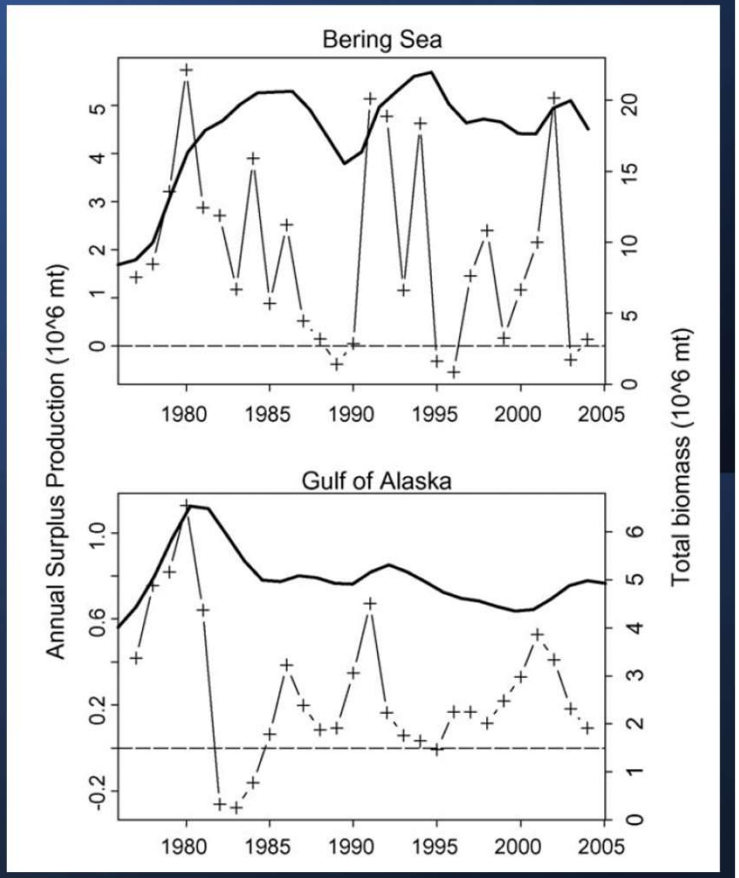


Briton et al. (in press) Marine & Freshwater Research: Supp Mat.

SESSF
Multi-species Harvest Strategy

Thank-you

Ecosystem Catch Cap



SESSF
Multi-species Harvest Strategy

- Total catch from the ecosystem (summing across all species)
- Prevent ecosystem over-exploitation
- If sum(TAC) > cap need allocation rule
- Purely biological vs socioecological

Calculated using aggregate production model

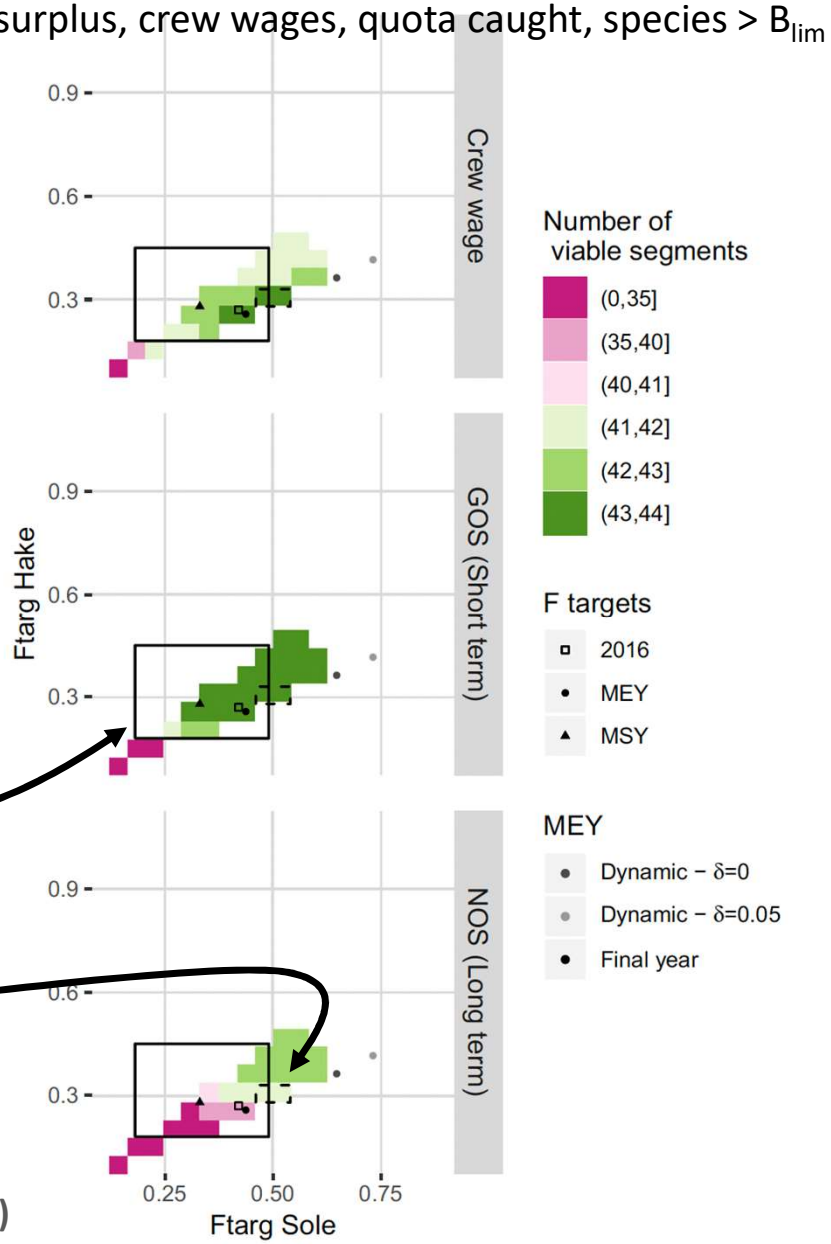
eg Mueter & Megrey (2006)

Ecosystem catch cap

- Total catch from the ecosystem (summing across all species)
- Prevent ecosystem over-exploitation
- If sum(TAC) > cap need allocation rule
- Purely biological vs socioecological

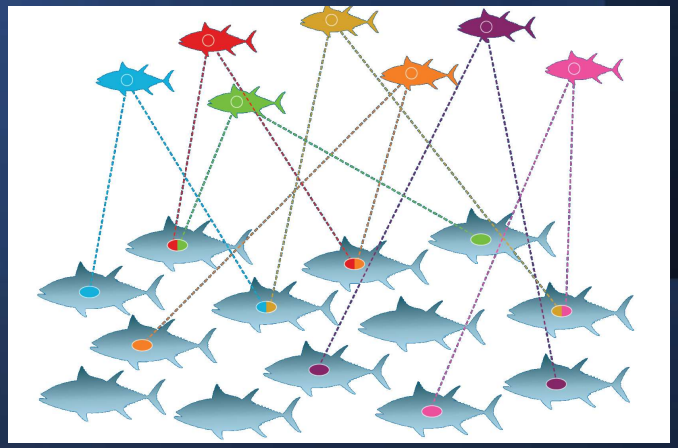
FMSY range for the two species

Joint viability ('eco-viability')



eg Briton et al (2020)

Close-kin



SESSF
Multi-species Harvest Strategy

Uses genetics to determine how related fish are

Provides measurement of:

1. (Absolute) abundance
2. Fishing mortality, (F)

Harvest strategy considerations:

- Option 1 (easiest): use abundance estimate in Tier 1 assessment
- Option 2 (harder): use abundance and F in a Tier 3–like (F-based) harvest strategy

Dynamic Tier 4

SESSF
Multi-species Harvest Strategy

- Model based
- Tier 4:
  - Assumes MSY / MEY is associated with the reference period in Tier 4
  - CPUE fitted production model
- Model allows projection into the future

Buffers

Buffers are risk-modifications to RBCs.

Box 5.

The Guidelines for Implementation of the HSP suggest that: "If a harvest strategy has been simulation tested using MSE, for example, and shown to conform to the Harvest Strategy Policy in terms of achieving risk equivalency, then no buffer is required."

How do you think other management measures such as preventing access to a significant proportion of a stock, be treated in considering risk equivalency?

Do you think that time-based buffers be should be considered, and what interval of MYTAC should be considered?

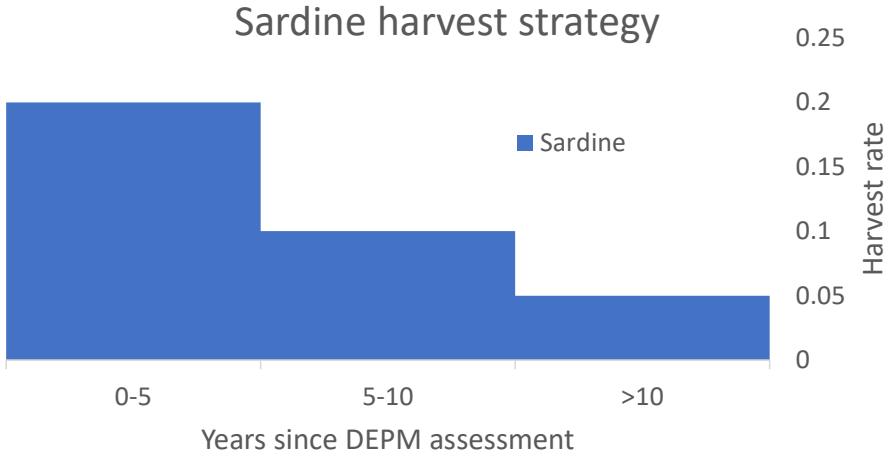
SESSF
Multi-species Harvest Strategy

Rationale **Tier-based** buffers:

Risk-cost-catch context

1. tier-based buffer seeks risk equivalency across tiers
2. (alternative rationale) tier-based buffer provides (dis-) incentive to low cost (high-risk) assessment

Rationale **Time-based** buffers:
As time since last assessment progresses, uncertainty over status increases

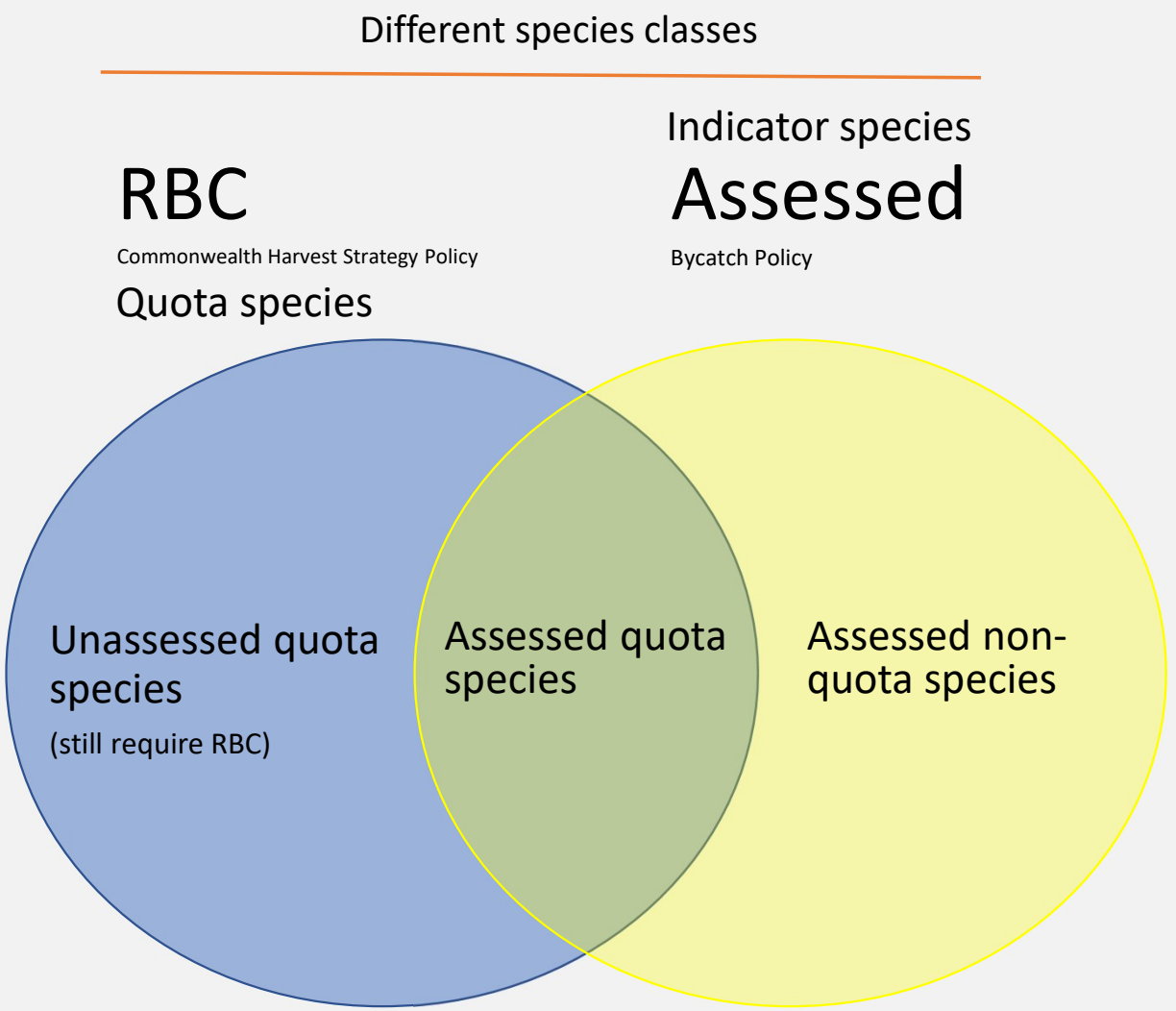


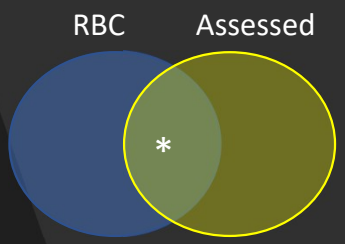
SESSF
Multi-species Harvest Strategy

Dynamic B0

III. Assembling a multi-species harvest strategy

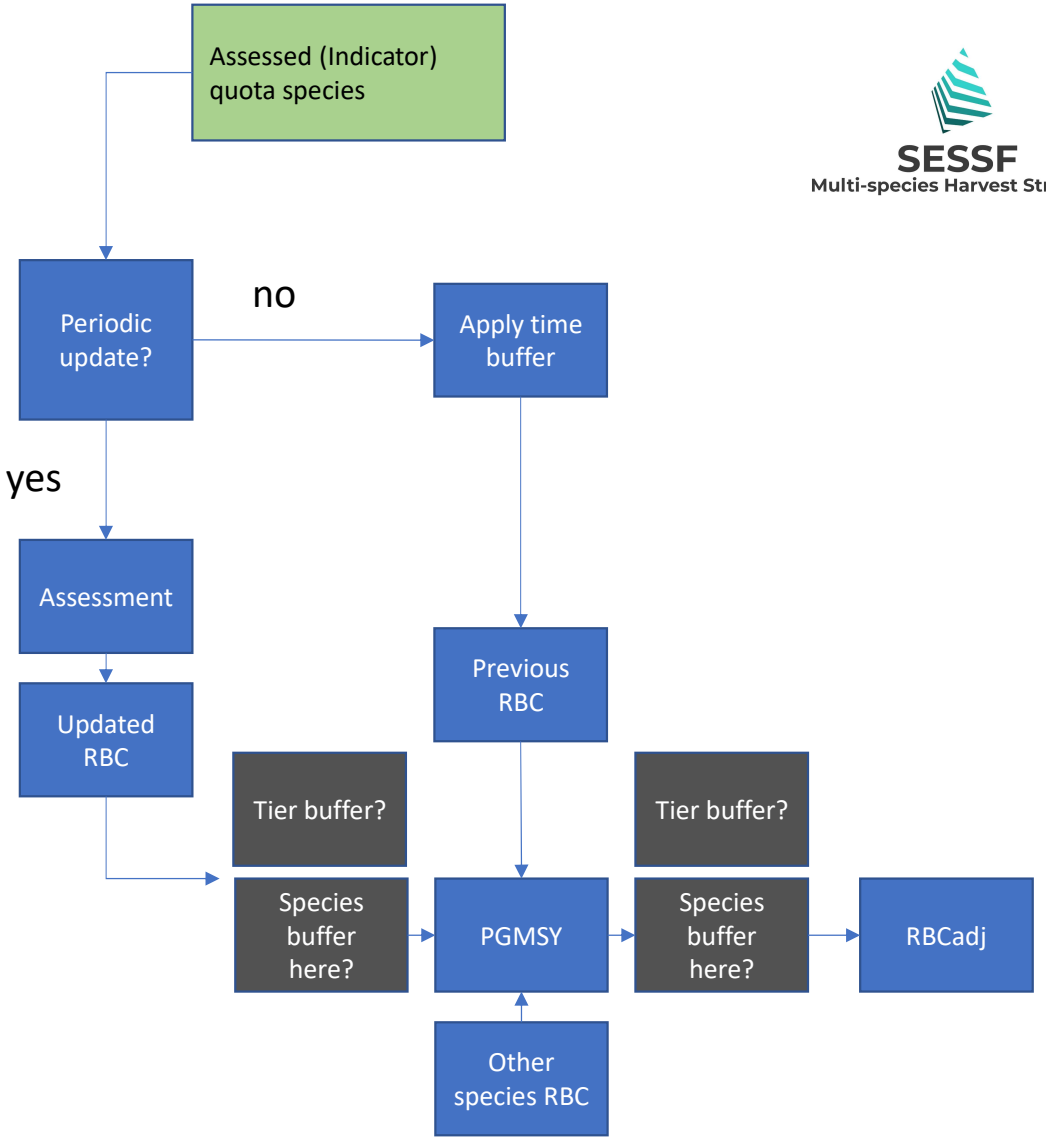
How this might look?

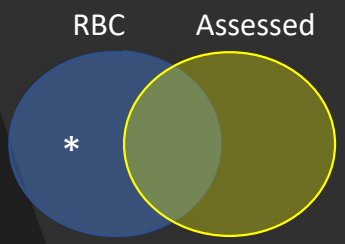




Assessed quota species

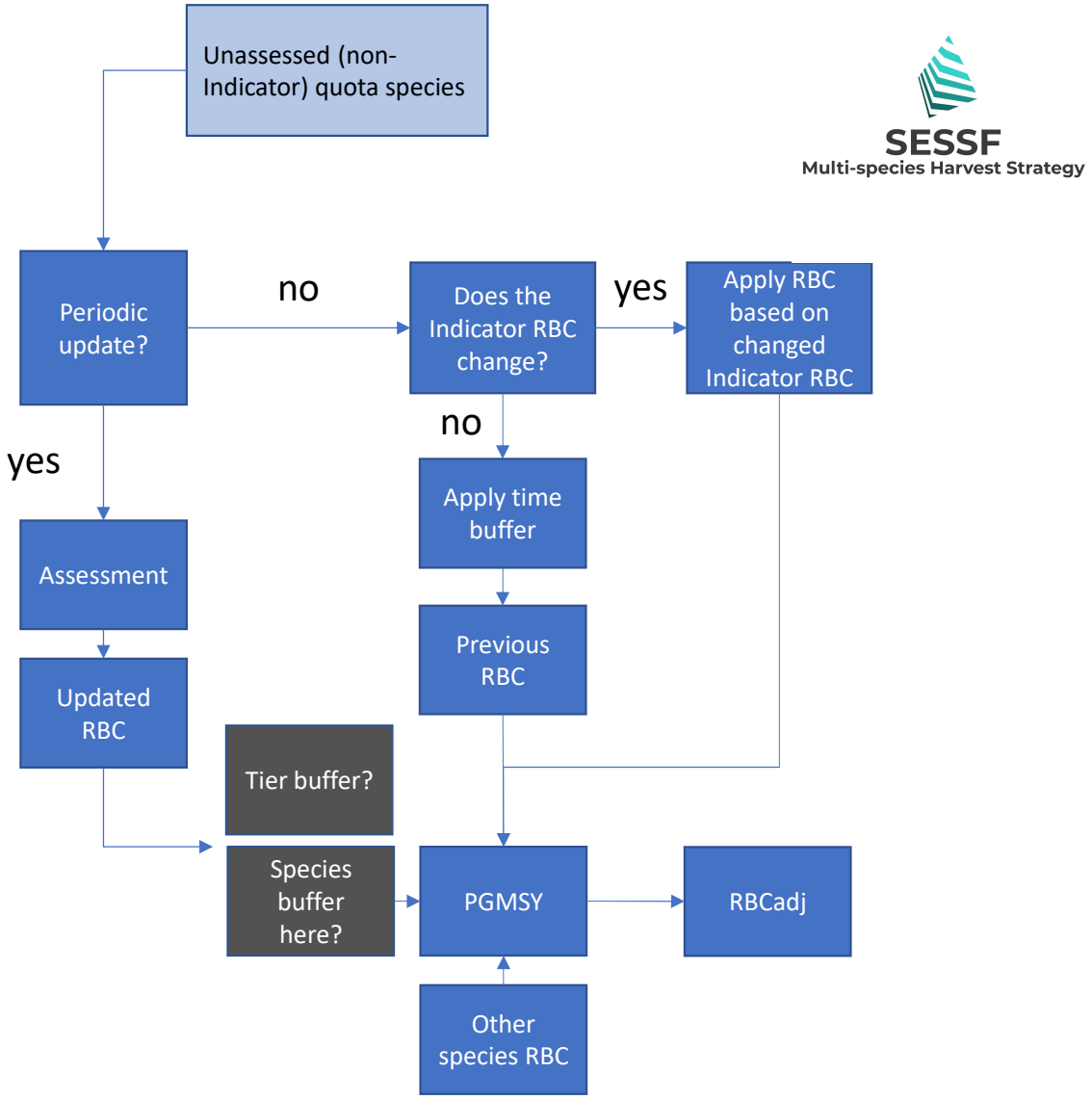
SESSF
Multi-species Harvest Strategy

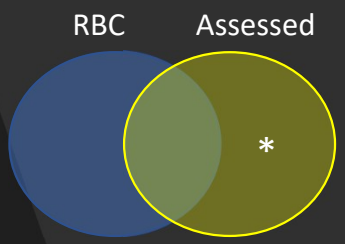




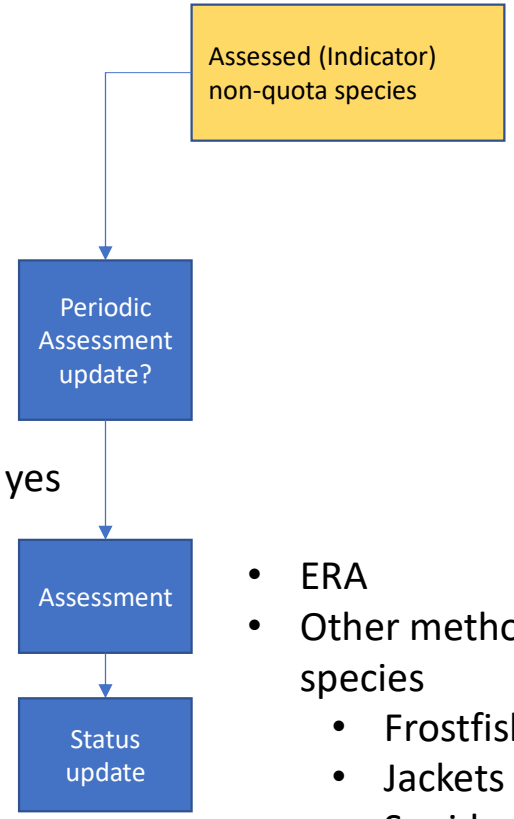
Unassessed quota species

SESSF
Multi-species Harvest Strategy





Assessed non-quota species



SESSF
Multi-species Harvest Strategy

- ERA
- Other methods for economically important non-quota species
  - Frostfish
  - Jackets
  - Squid

Survey feedback

Project 2023-010: Guiding development of harvest strategies for complex data-limited fisheries

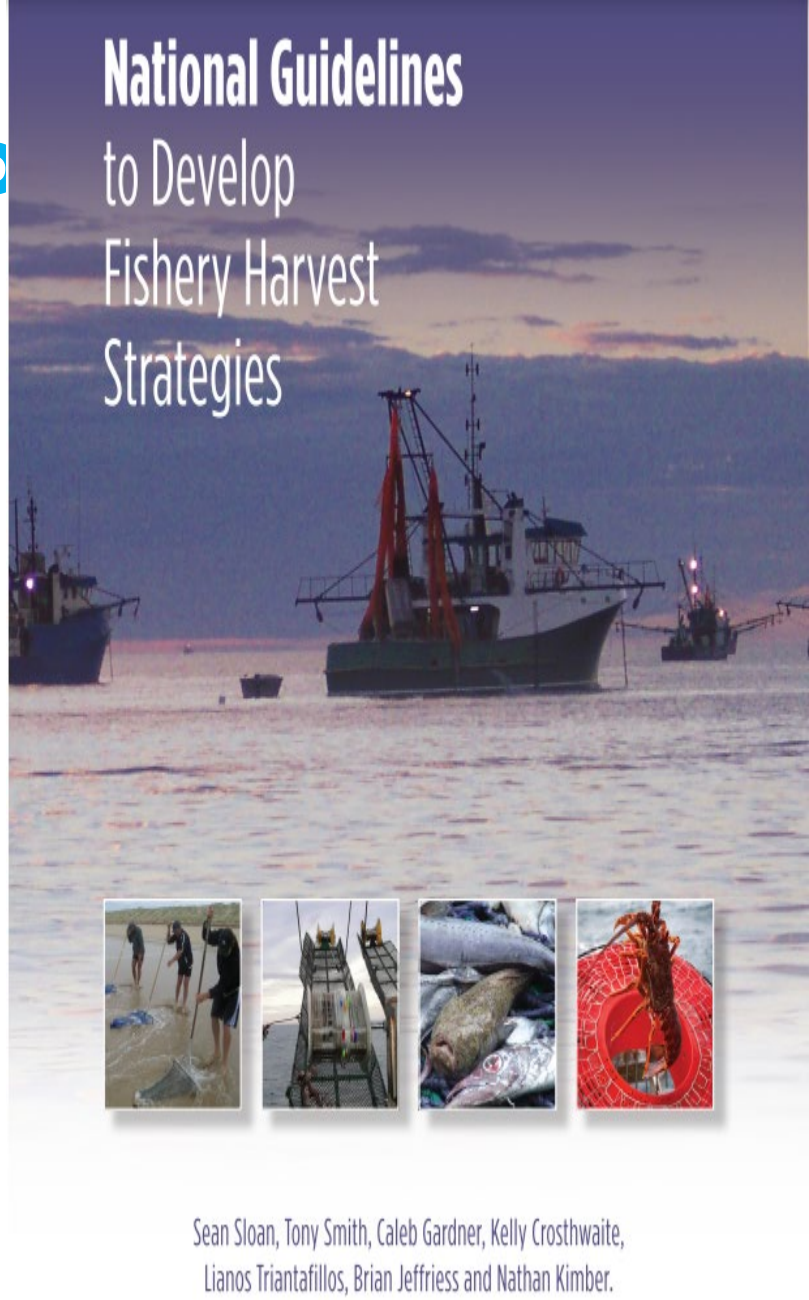
Fowler A, Bessel-Browne P, Chick R, Cope J, Dowling N, Fisher E, Hesp A, Hill N, Hughes J, Lowry M, Newman S, Noell C, Pascoe S, Taylor B, Tuck G, Usher M, Walters S, Williams S, Wise B

The opportunity

- Many of Australia's fisheries are data-limited (DL) and lack harvest strategies (HSs)
- Unique combinations of complexities; multispecies, multisector, multi-gear
- Delayed development and implementation of HSs
- Overly simplistic HSs that don’t address objectives

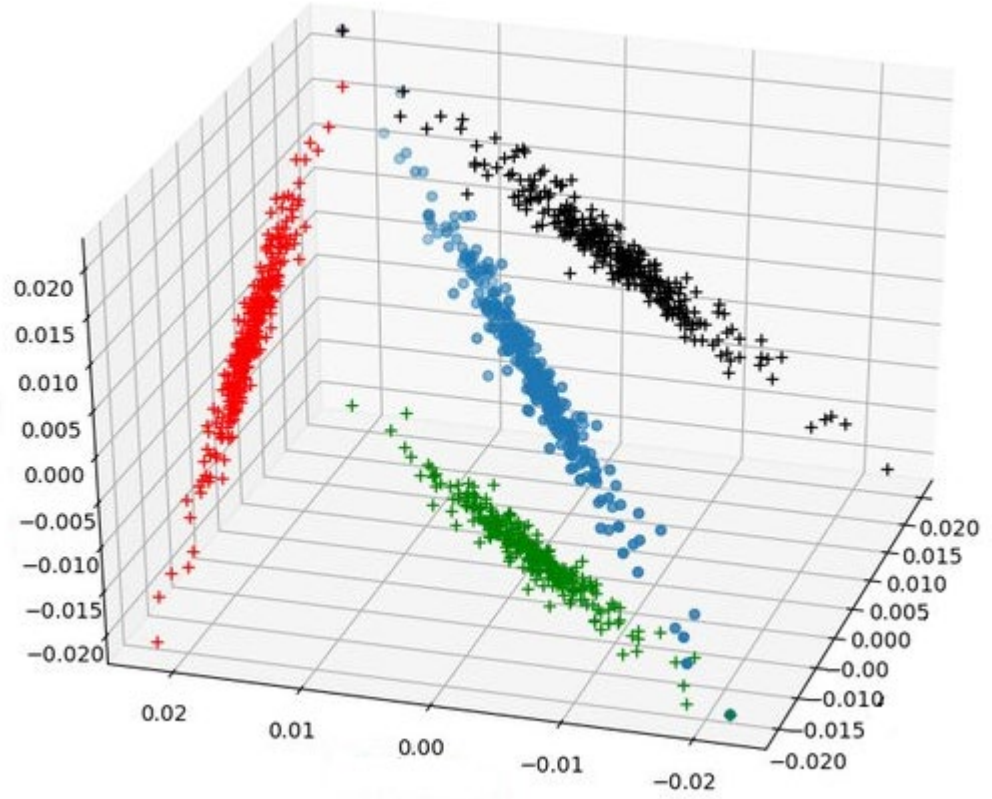
What's been done already?

- Broader HS development guidelines (need extension to support DL-specific)
- Progress on identifying appropriate HS components (monitoring, assessment, decision rules) for DL fisheries
- Non-DL: methods for optimising HSs across multiple sectors and types of objectives (TBL/QBL)
- Non-DL: methods for including multiple species



What we propose

- A guide to integration of HS components (linkage, articulation and architecture) given the particular characteristics of a DL fishery
- Likely a ‘spectrum’ of DL fisheries defined by unique combinations of numerous characteristics (Cope et al. 2023)
- Identify clusters of characteristics in Australian DL fisheries - ‘archetypal’ fisheries



Objectives

1. A Synthesis of DL fishery characteristics relevant to HS development
2. Identify suitable approaches for integrating key characteristics of DL fisheries within HSs
3. A Guide for HS development for DL fishery ‘archetypes’ and decision support for fine-tuning
4. Examples of successful HSs developed for archetypal DL fisheries
5. Demonstrate application of the Guide to case-study fisheries
6. Undertake MSE on an example DL HS

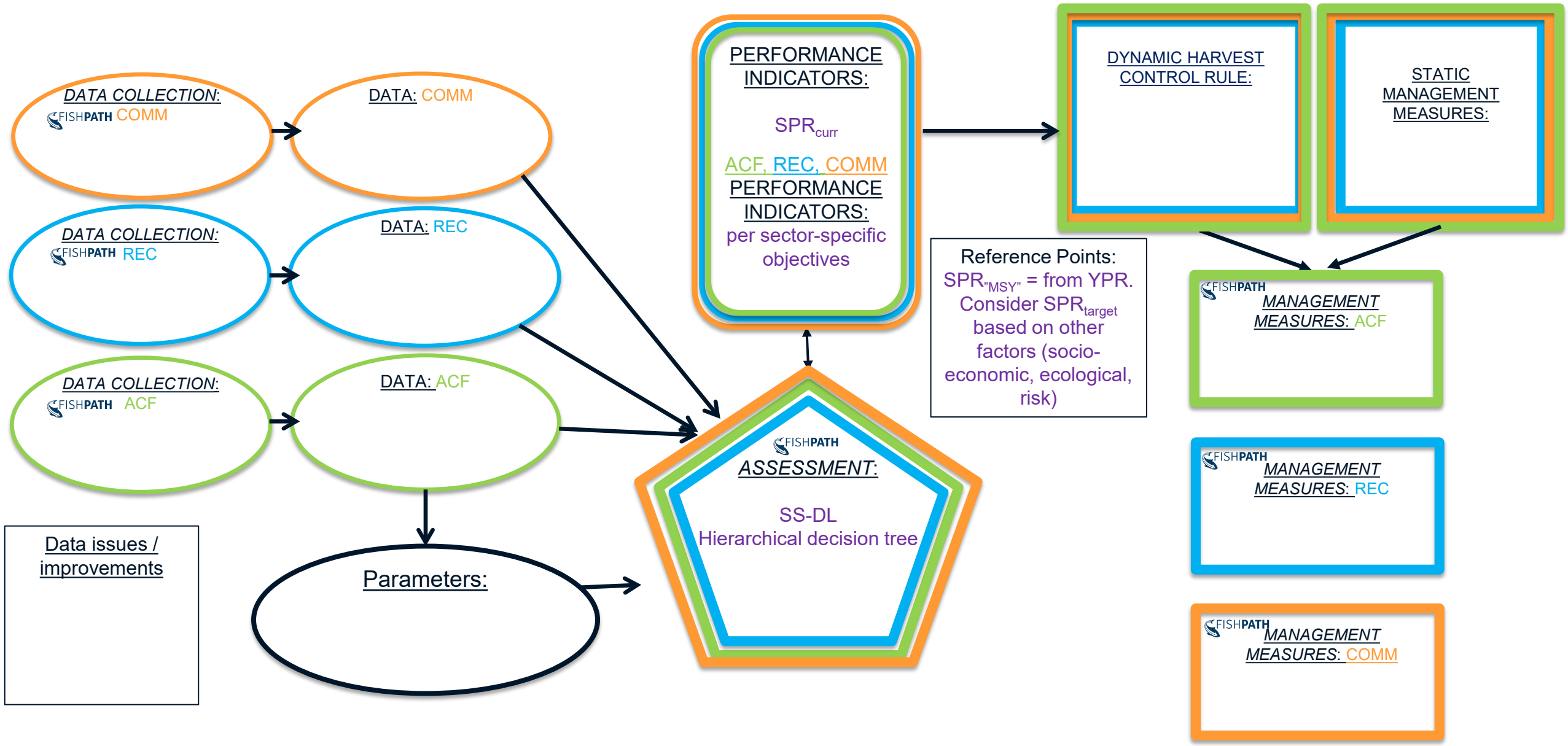
Who wanted it?

- FRDC priority nominated by NSW RAC, supported by Qld, SA, and WA
- Project team includes scientists and managers from 6 jurisdictions
- Letters of Support from fisheries managers in all jurisdictions involved with this application

Methods

- Literature reviews, team knowledge/experience, workshops with fisheries scientists and managers in Aust.
- Builds on the FishPath Tool and Process by providing advice on:
  - linking of DL HS components,
  - articulating component details,
  - HS architecture (via templates and decision support tools)

Harvest Strategy Template – linking components and sectors



J. Cope pers. comm.

Methods

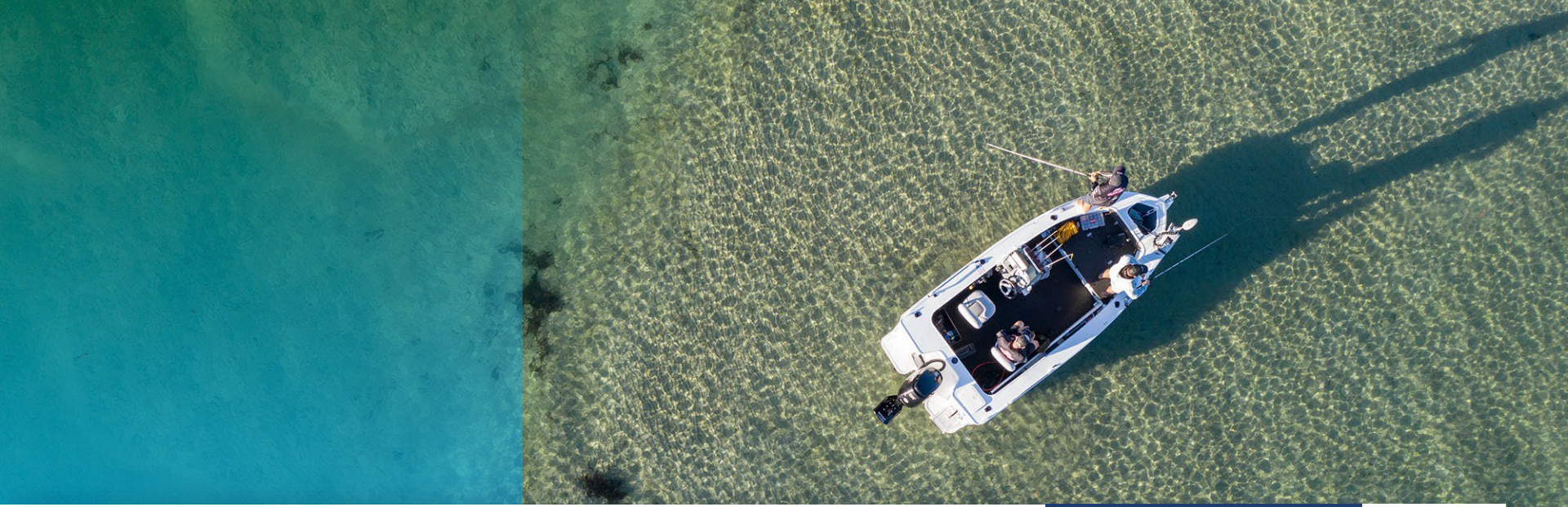
- Review topics:
  - Key characteristics of DL fisheries
  - Approaches for integrating them in HSs
  - Australian DL fisheries and existing HSs
- HS templates developed for archetypal fisheries to ‘jump-start’ HS development
- Workshop 1 – consolidate findings of the review and develop guidance (project team, expert facilitator)
- Workshop 2 – draft guidelines presented to fisheries managers in Aus.

Extension

A practical, user-friendly guide to assist fisheries practitioners with HS development for DL fisheries

Extension plan:

1) Increase knowledge of the different types of DL fisheries, so they can be recognised
2) Empower practitioners with tools to develop effective tailored HSs
3) Ensure that stakeholders aware of project outcomes and implications for fisheries sustainability
4) Communicate outcomes to the wider scientific



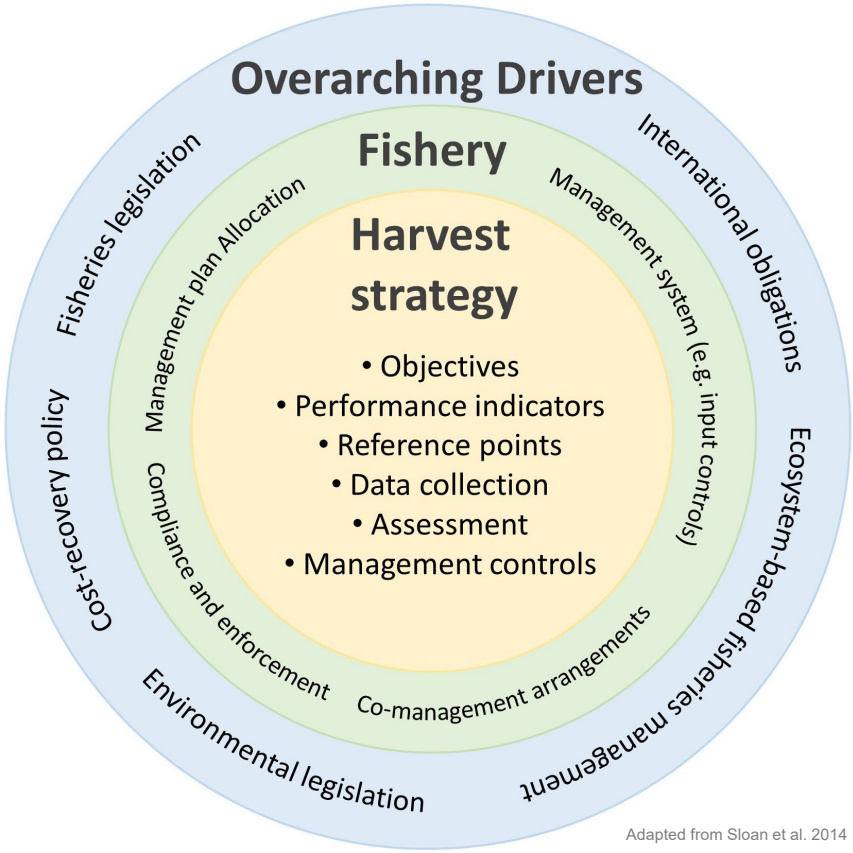
Project 2019-021: Integrating recreational fishing into harvest strategies

Fowler AM, Dowling NA, Bolton P, Folpp H, Harnwell J, Hughes JM, Lowry M, Lyle JM, Lynch TP, McIlgorm A, Miles NG, Nichols R, Ochwada-Doyle FA, Pepperell J, Stark K, Tracey S, Chick RC

B Hodges

Recreational fishing?

- HSs developed for the commercial sector
- Need to account for all mortality
- Need to ensure equitable fishery performance



Adapted from Sloan et al. 2014

Project objectives

1. Review recreational fishing objectives
2. Identify rec data that can measure fisheries performance
3. Extend the FishPath tool to better characterise rec fishing
4. Develop recommendations for integrating recreational fishing into harvest strategies
5. Develop draft harvest strategies for key multi-sector fisheries using outcomes from Objectives 1-4.

1. Broad objectives

1. Catch fish
2. Receive bites or strikes
3. Obtain food
4. Catch large or 'trophy' fish
5. Ensure a sustainable fishery
6. Avoid environmental impacts of fishing
7. Generate economic value for the RF industry
8. Enhance the value of the fishing experience
9. Easy access to fishing locations
10. Improve participation in RF ('grow the sport')
11. Compete against other fishers
12. Equitable access to fish stocks
13. Enhance social networks, or social capital
14. Foster a positive public image of RF
15. Improve fishing knowledge
16. Flexible management to meet RF needs
17. Transparent management
18. Involvement in fisheries management advisory processes
19. Enjoy the outdoors/nature
20. Spend time with friends and family
21. Relaxation, or to reduce stress
22. To be on your own

Specific objectives

1.1 Maximise the number of trips where a fish is caught
1.2 Maximise the number of fish caught per fisher day

Fowler et al. (2022). Integrating recreational fishing into harvest strategies: linking data with objectives. *ICES Journal of Marine Science*, *79*(2), 285-307.

1. Stock-specific objectives

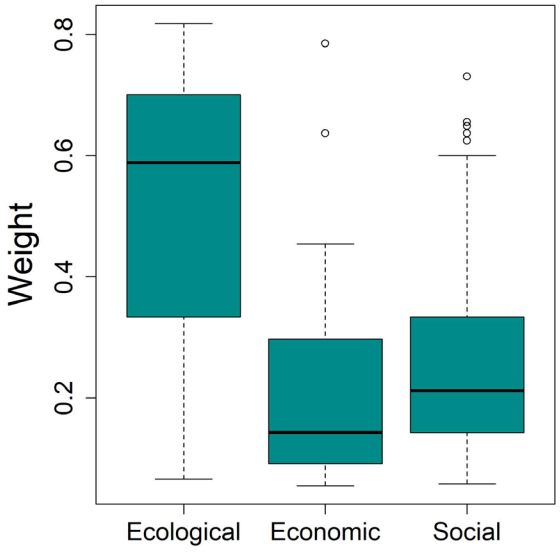
- Workshops to identify RF objectives
  - Kingfish, snapper, mulloway
- Short online sessions
  - Fishers, managers, scientists
- Co-developed objectives
  - Broad list
  - HS list
- Preferences
  - Workshop participants
  - Statewide (random, self-selecting)

C Davey

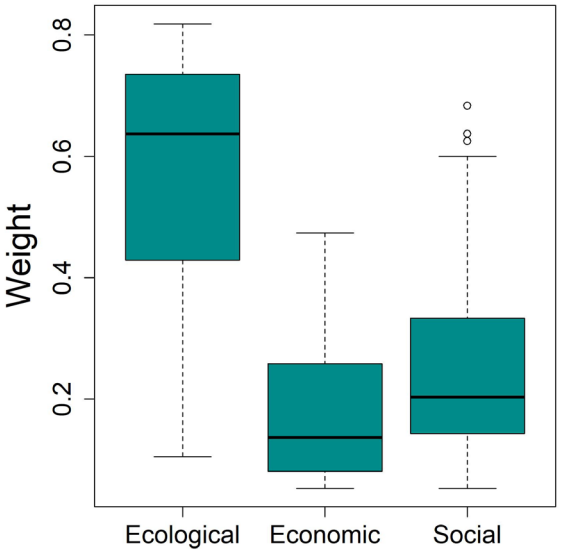
Broad objective	Sub-objectives	Specific objectives
Ecological		
Economic		
Social		

1. Broad objectives - kingfish

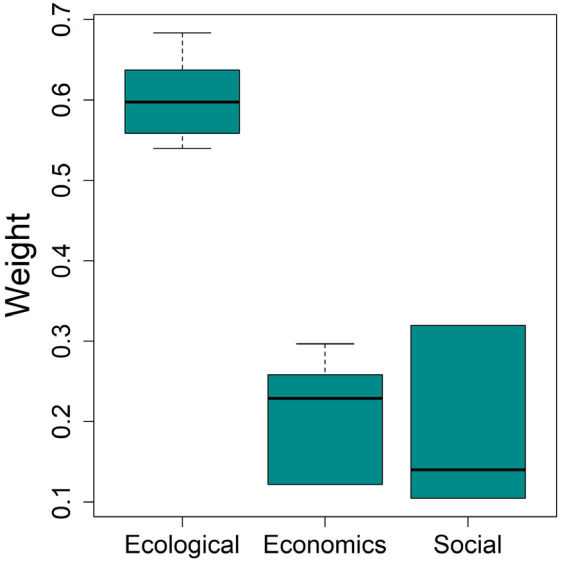
Telephone survey (random)



Web survey (self-selecting)



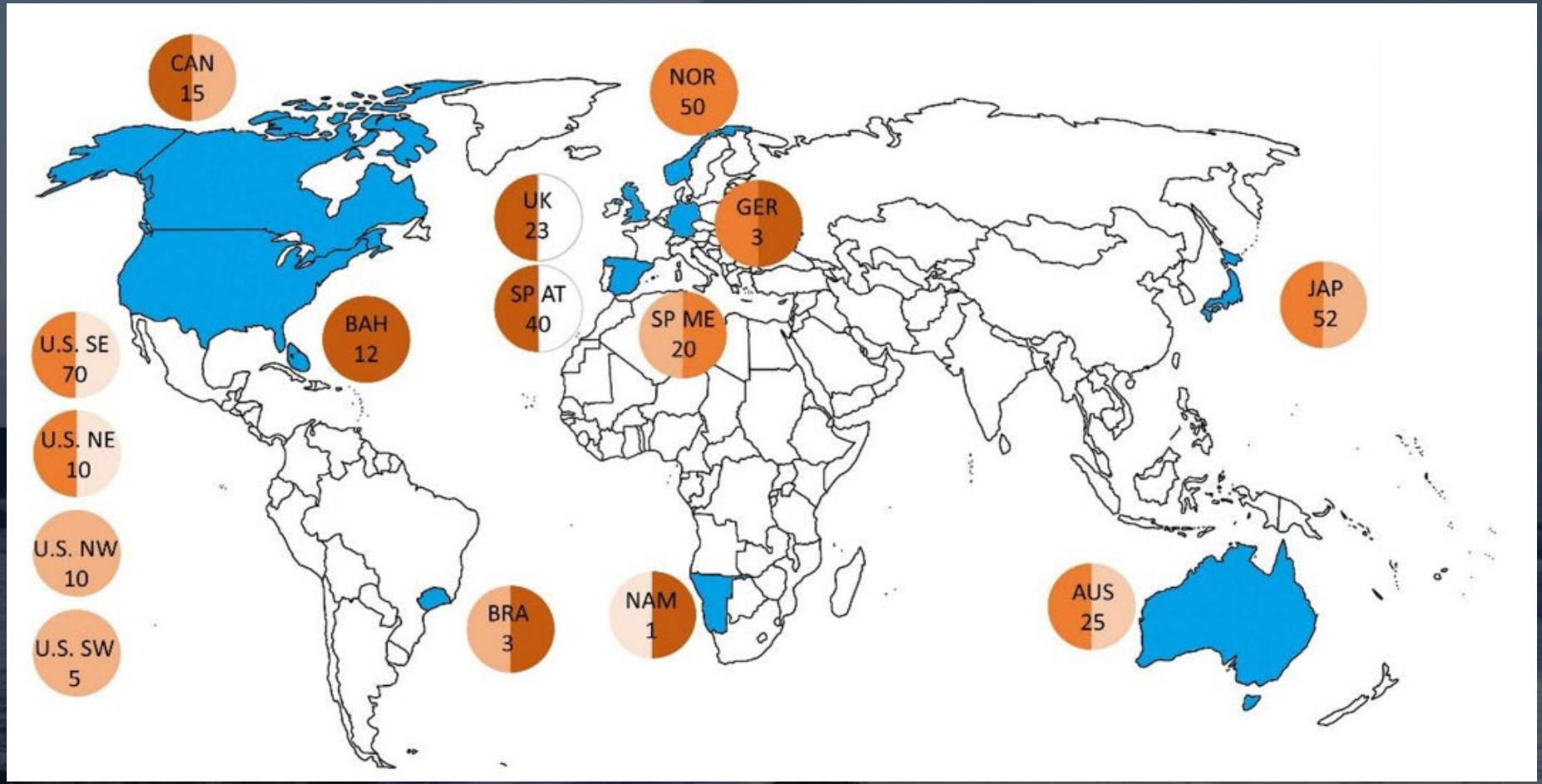
Workshop survey (small group)



1. Results summary

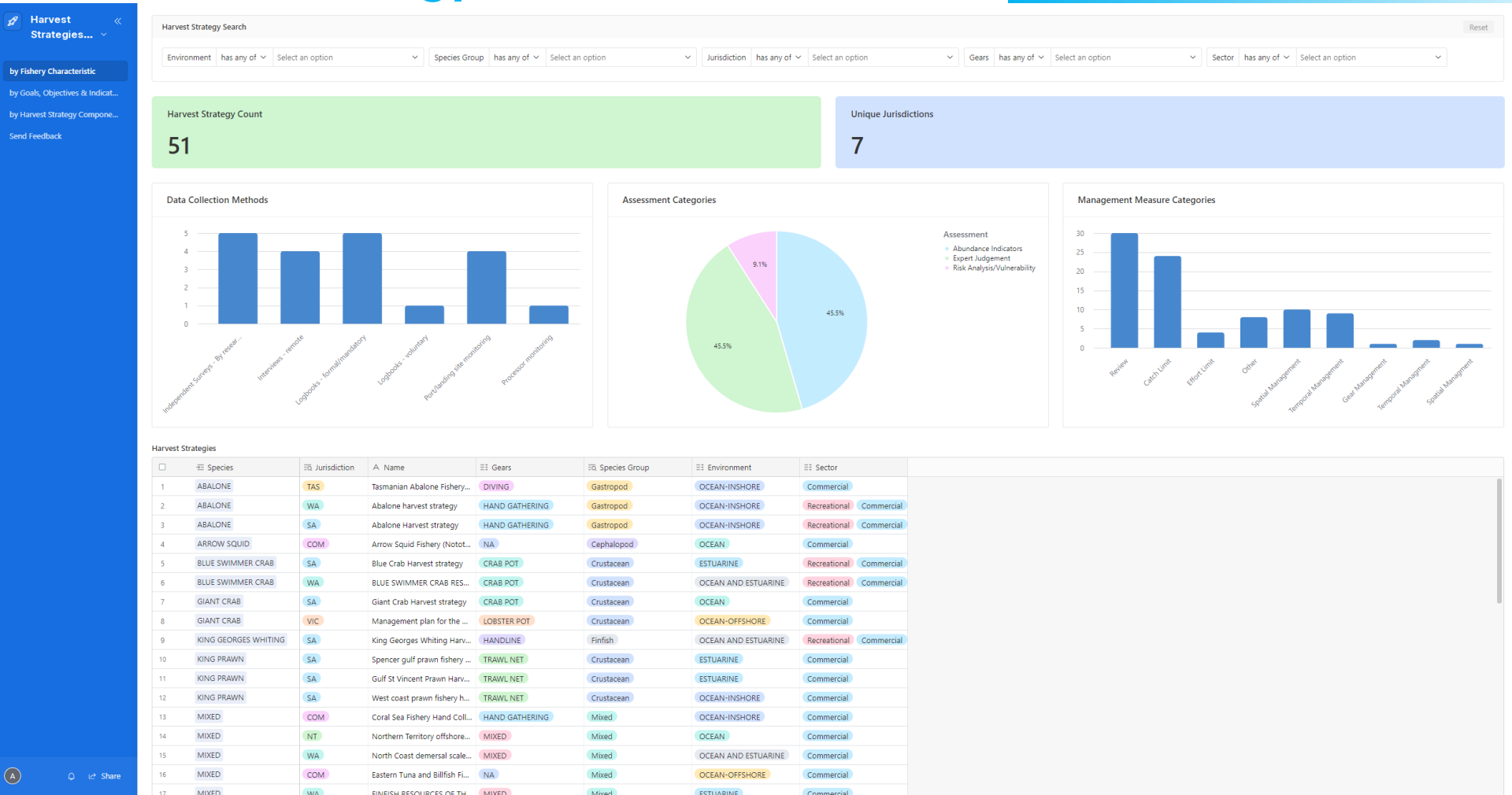
- RF objectives similar among stocks
  - Ensuring high survival of released fish
- Many RF objectives are social
  - Some ecologically linked, e.g. trophy fish
- RF objectives broadly align with other sectors
  - e.g. maintaining stock biomass
- Preference for ecol objectives
  - Spec ecol objectives – no clear preference

2. Rec sector inclusion in harvest strategies



Fowler et al. (2023) Toward sustainable harvest strategies for marine fisheries that include recreational fishing. *Fish and Fisheries*

2. Harvest strategy database

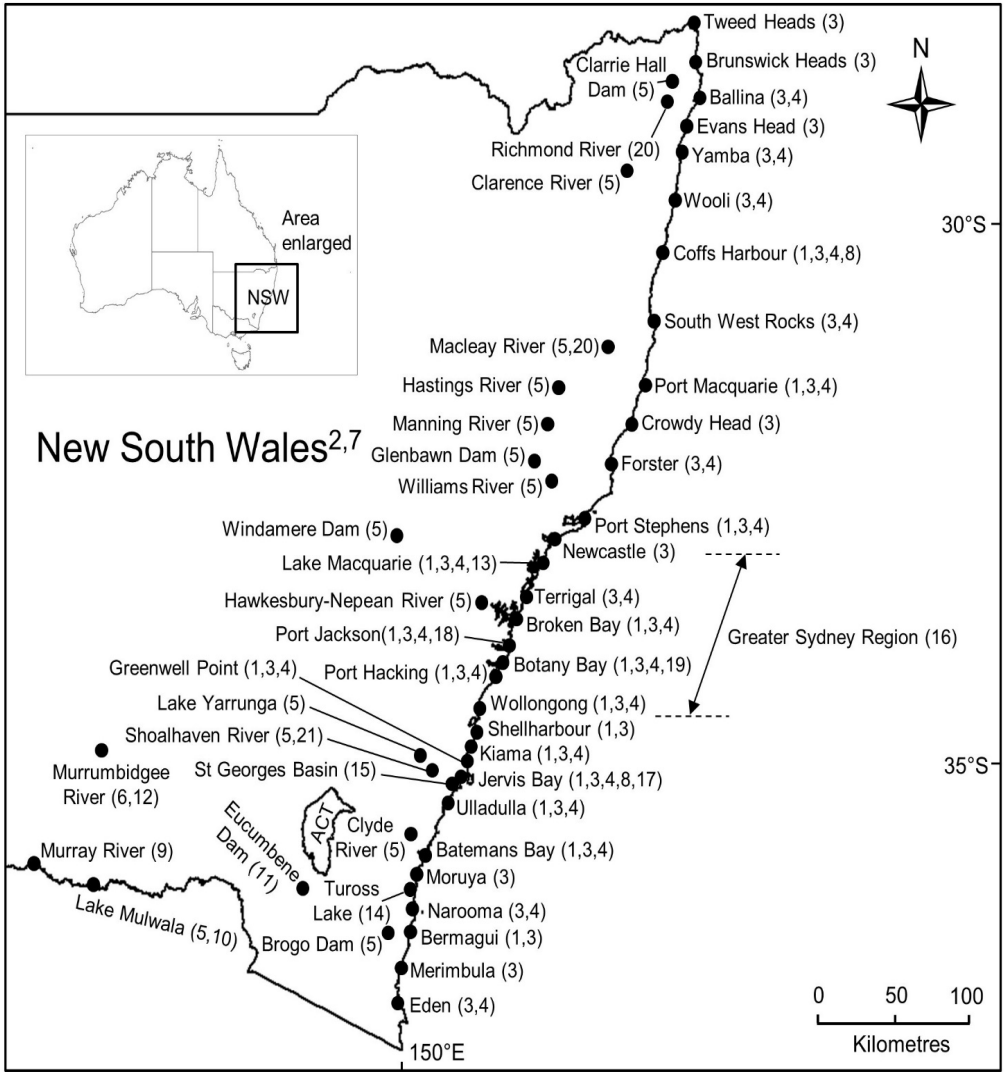


Harvest Strategies

	Species	Jurisdiction	Name	Gears	Species Group	Environment	Sector
1	ABALONE	TAS	Tasmanian Abalone Fishery...	DIVING	Gastropod	OCEAN-INSHORE	Commercial
2	ABALONE	WA	Abalone harvest strategy	HAND GATHERING	Gastropod	OCEAN-INSHORE	Recreational Commercial
3	ABALONE	SA	Abalone Harvest strategy	HAND GATHERING	Gastropod	OCEAN-INSHORE	Recreational Commercial
4	ARROW SQUID	COM	Arrow Squid Fishery (Notot...	NA	Cephalopod	OCEAN	Commercial
5	BLUE SWIMMER CRAB	SA	Blue Crab Harvest strategy	CRAB POT	Crustacean	ESTUARINE	Recreational Commercial
6	BLUE SWIMMER CRAB	WA	BLUE SWIMMER CRAB RES...	CRAB POT	Crustacean	OCEAN AND ESTUARINE	Recreational Commercial
7	GIANT CRAB	SA	Giant Crab Harvest strategy	CRAB POT	Crustacean	OCEAN	Commercial
8	GIANT CRAB	VIC	Management plan for the ...	LOBSTER POT	Crustacean	OCEAN-OFFSHORE	Commercial
9	KING GEORGES WHITING	SA	King Georges Whiting Harv...	HANDLINE	Finfish	OCEAN AND ESTUARINE	Recreational Commercial
10	KING PRAWN	SA	Spencer gulf prawn fishery ...	TRAWL NET	Crustacean	ESTUARINE	Commercial
11	KING PRAWN	SA	Gulf St Vincent Prawn Harv...	TRAWL NET	Crustacean	ESTUARINE	Commercial
12	KING PRAWN	SA	West coast prawn fishery h...	TRAWL NET	Crustacean	OCEAN-INSHORE	Commercial
13	MIXED	COM	Coral Sea Fishery Hand Coll...	HAND GATHERING	Mixed	OCEAN-INSHORE	Commercial
14	MIXED	NT	Northern Territory offshore...	MIXED	Mixed	OCEAN	Commercial
15	MIXED	WA	North Coast demersal scale...	MIXED	Mixed	OCEAN AND ESTUARINE	Commercial
16	MIXED	COM	Eastern Tuna and Billfish Fi...	NA	Mixed	OCEAN-OFFSHORE	Commercial
17	MIXED	WA	FINFISH RESOURCES OF TH...	MIXED	Mixed	ESTUARINE	Commercial

2. Rec data sources

- Many data sources to monitor ecol objectives
  - time-series
  - reference points
- Mostly estuarine and marine
- Few data sources for non-ecol objectives
  - Increasing participation
  - Maintaining equity/allocation



3. FishPath enhancement

- Online tool for HS development

Example question

This question pertains to issues of implementation.

Is the fishery boat-based, and if so, is it sensible (given the size of the boat or the nature of the operation) to consider on-board automated monitoring systems (such as cameras or vessel monitoring systems), or an observer program?

If fishing is not boat based, or if (for example) boats are very small, or unregistered, or if the boat's activity does not provide insight as to effort or fishing location, then certain forms of onboard automated monitoring may be irrelevent, impractical or uninformative.

- ○ Yes
- ◉ No
- ○ Unknown

This answer impacts 10 options

ADD NOTE CANCEL SAVE

3. FishPath enhancement

- Online tool for HS development
- Expert review of the FishPath tool
  - Language
  - Irrelevant questions/options
  - Catch & release, time-series social and econ
- Workshop with FishPath core team to provide feedback
- Software developer enacting changes
  - Rec fishing filter

3. Rec fishing filter for FishPath

Full questionnaire → **Admin pre-answers and removes questions Allow saving filter for reuse** → **Questionnaire shown to user** → **Results**

Full questionnaire
Question 1
Question 2
Question 3
Question 4
Question 5
Question 6

Admin pre-answers and removes questions Allow saving filter for reuse
Question 2 → Answer No
Question 4 → Answer NA
Question 5 → Remove (not relevant)

Questionnaire shown to user
Question 1
Question 3
Question 6

Results

Results will calculate criteria and caveats based on questions 1, 2, 3, 4, & 6. It will not show criteria or caveats based on 5.

4. Guidelines & Recommendations

- Urgent review of existing HSs
- Holistic decisions on sectoral inclusion
- Identifying, prioritising and consolidating RF objectives
- Linking RF objectives to data sources and performance indicators for monitoring
- Methods for operational inclusion in HSs (assessments, control rules)

5. HS development

- Currently underway via HS working groups
  - Mulloway Harvest Strategy Working Group
  - Line & Trap Harvest Strategy Working Group
- FishPath questionnaires completed
- Results narrowing completed
- Draft HS components developed for Working Groups

Acknowledgements

NSW recreational fishers who participated in workshops

FRDC Steering Committee

Ash Fowler - ashley.fowler@dpi.nsw.gov.au

FRDC
FISHERIES RESEARCH & DEVELOPMENT CORPORATION

Recreational Fishing Trusts

2022-170: Integrating recreational fisher experience/satisfaction into decision making

Milestone Progress - Task 3 (due June 24)

Presentation to Harvest Strategy Webinar

14 December 2023

Nicola Pitt, Luke Sexton, Neil Howells

FRDC
FISHERIES RESEARCH AND DEVELOPMENT CORPORATION

Project 1 Overview

Study Need:

Fisher experience is regarded as an important measure of defining optimal resource use for non-commercial fishing sectors.

The lack of recreational fisher experience data was highlighted at a national level and explored in FRDC project 2018-161.

Key fishing stakeholders have identified their desire to include experiential performance indicators into fisheries harvest strategies to optimise the management of available resources in the Northern Territory. This is especially important in fishery management areas where management for optimised recreational outcomes have been prioritised (e.g. Barramundi).

The need to apply and test existing frameworks for measuring fisher experience (or satisfaction) is necessary to validate their utility in the Northern Territory and more broadly across jurisdictions.

This includes understanding the interaction between fisher satisfaction/experience and catch settings and other administrative arrangements that may influence fisher experience.

Study Objectives & Deliverables:

Define recreational fisher experience into measurable metrics, distinguishing between fishery dependent and peripheral factors as well as considering data sources, collection methods, and assumptions.

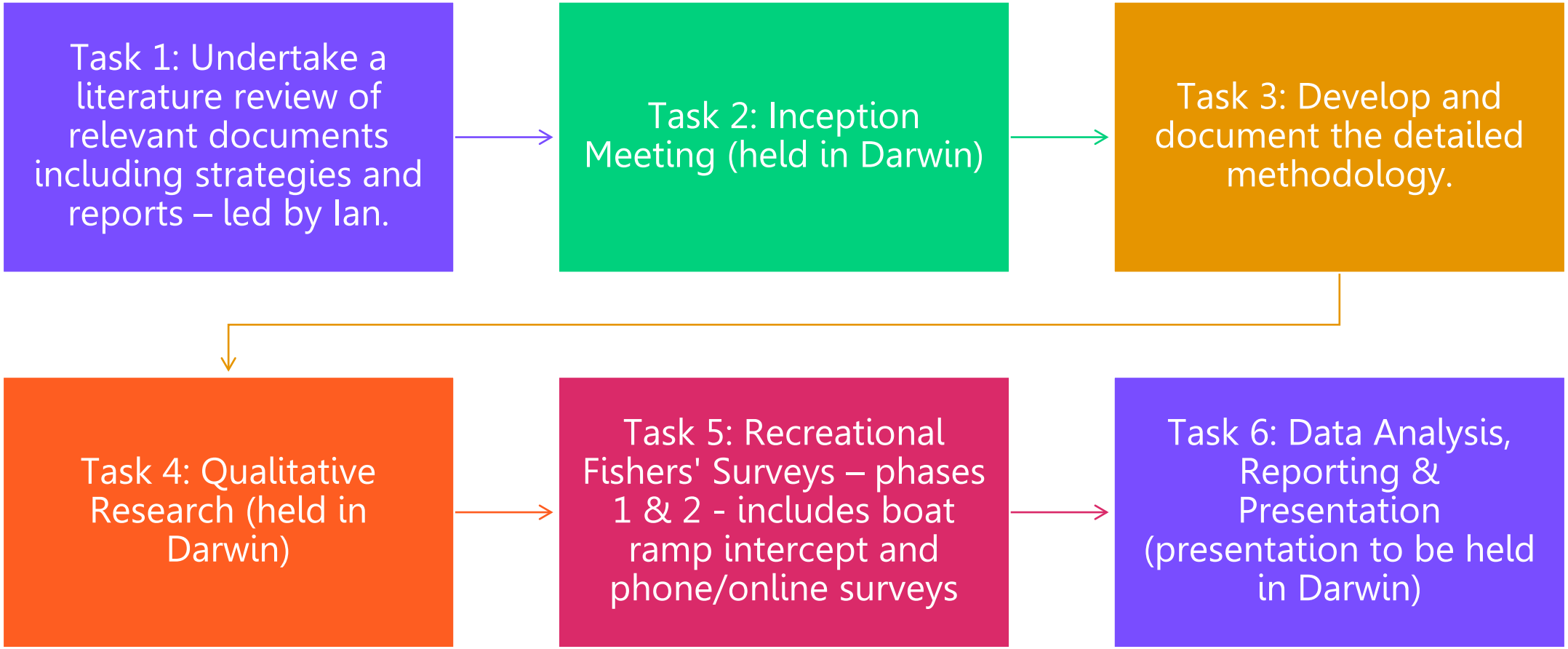
Recommendations of how metrics of recreational fisher experience can be applied in a fishery harvest strategy.

Consideration should be given to the use of a case study fishery.

Meet our team:

- Blake Taylor – Fisheries NT
- David Ciaravolo - AFANT
- Ian Knuckey – Fishwell Consulting
- Jake Maynard – Fisheries NT
- Kane Dysart - NTGFIA
- Tim Porter – Fisheries NT
- Luke Sexton – Action Market Research
- Neil Howells – Hudson Howells
- Nicola Pitt – Action Market Research
- Ricardo Maldonado – Power Stats

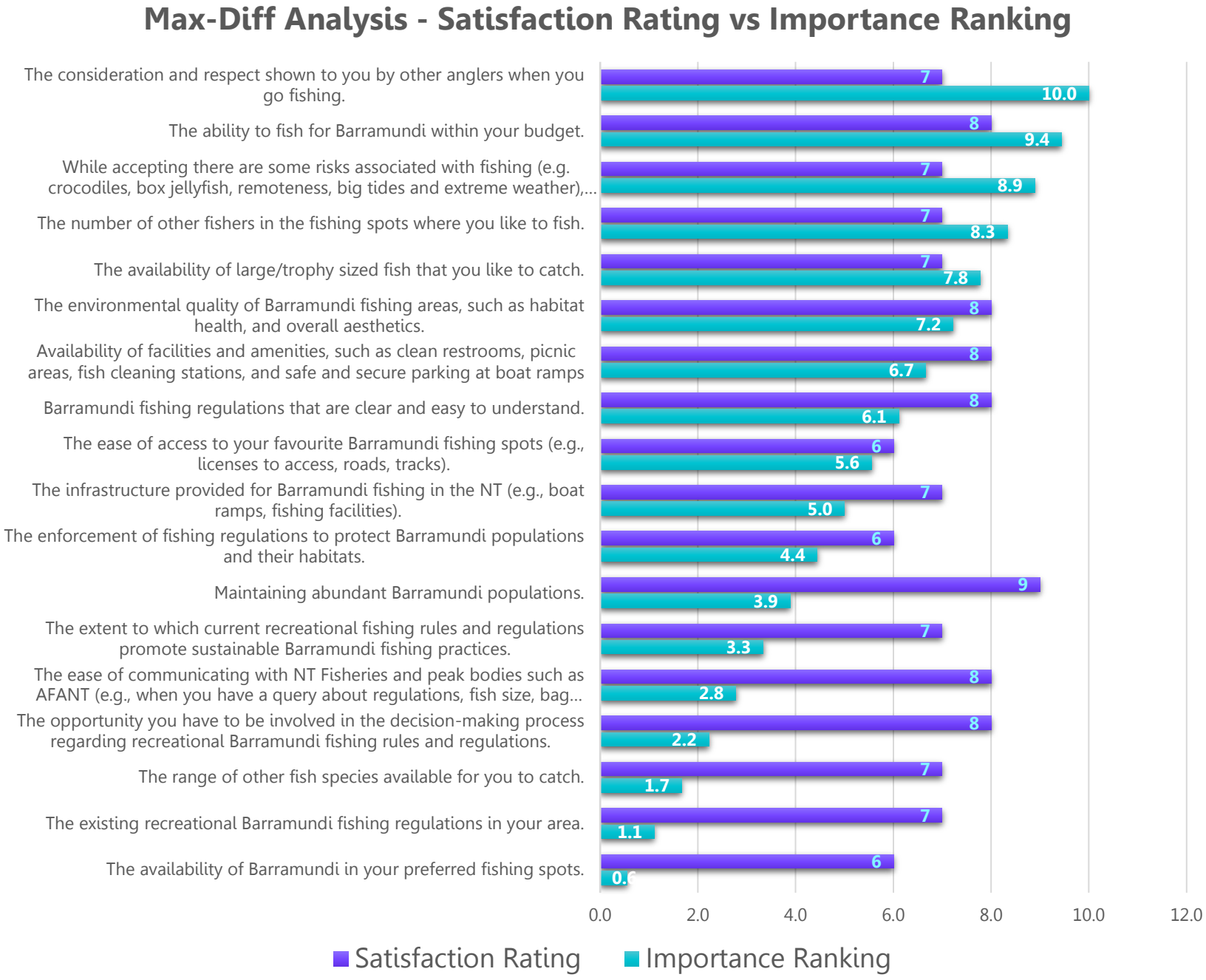
Project Methodology:



Importance & Satisfaction:

IMPORTANCE STATEMENTS FOR MAX-DIFF ANALYSIS
The availability of Barramundi in your preferred fishing spots.
The existing recreational Barramundi fishing regulations in your area.
The range of other fish species available for you to catch.
The opportunity you have to be involved in the decision-making process regarding recreational Barramundi fishing rules and regulations.
The ease of communicating with NT Fisheries and peak bodies such as AFANT (e.g., when you have a query about regulations, fish size, bag limits, when and where you can or can't fish, catch and release regulations).
The extent to which current recreational fishing rules and regulations promote sustainable Barramundi fishing practices.
Maintaining abundant Barramundi populations.
The enforcement of fishing regulations to protect Barramundi populations and their habitats.
The infrastructure provided for Barramundi fishing in the NT (e.g., boat ramps, fishing facilities).
The ease of access to your favourite Barramundi fishing spots (e.g., licenses to access, roads, tracks).
Barramundi fishing regulations that are clear and easy to understand.
Availability of facilities and amenities, such as clean restrooms, picnic areas, fish cleaning stations, and safe and secure parking at boat ramps
The environmental quality of Barramundi fishing areas, such as habitat health, and overall aesthetics.
The availability of large/trophy sized fish that you like to catch.
The number of other fishers in the fishing spots where you like to fish.
While accepting there are some risks associated with fishing (e.g. crocodiles, box jellyfish, remoteness, big tides and extreme weather), ensuring these risks are minimised as much as possible
The ability to fish for Barramundi within your budget.
The consideration and respect shown to you by other anglers when you go fishing.

Example:

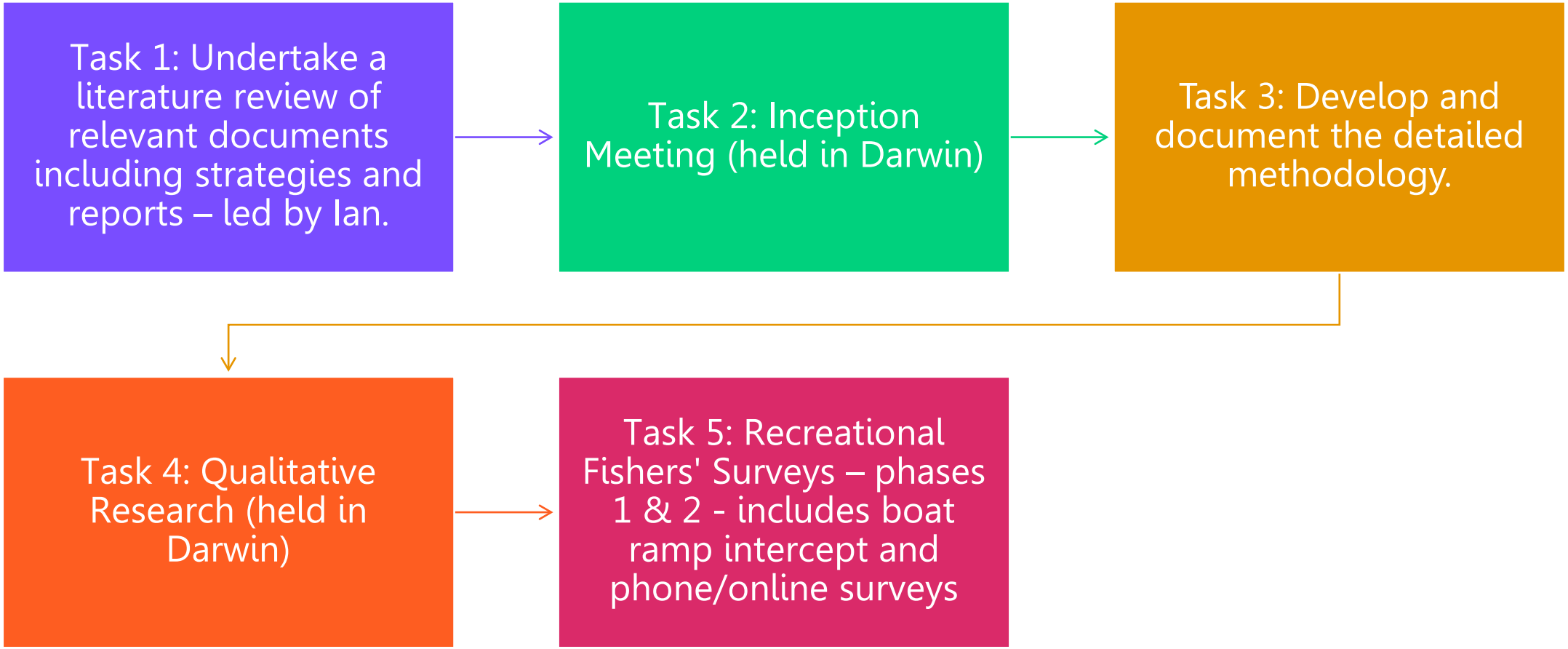

Max-Diff Analysis - Satisfaction Rating vs Importance Ranking
The consideration and respect shown to you by other anglers when you go fishing.
7
10.0
The ability to fish for Barramundi within your budget.
8
9.4
While accepting there are some risks associated with fishing (e.g. crocodiles, box jellyfish, remoteness, big tides and extreme weather),...
7
8.9
The number of other fishers in the fishing spots where you like to fish.
7
8.3
The availability of large/trophy sized fish that you like to catch.
7
7.8
The environmental quality of Barramundi fishing areas, such as habitat health, and overall aesthetics.
8
7.2
Availability of facilities and amenities, such as clean restrooms, picnic areas, fish cleaning stations, and safe and secure parking at boat ramps
8
6.7
Barramundi fishing regulations that are clear and easy to understand.
8
6.1
The ease of access to your favourite Barramundi fishing spots (e.g., licenses to access, roads, tracks).
6
5.6
The infrastructure provided for Barramundi fishing in the NT (e.g., boat ramps, fishing facilities).
7
5.0
The enforcement of fishing regulations to protect Barramundi populations and their habitats.
6
4.4
Maintaining abundant Barramundi populations.
9
3.9
The extent to which current recreational fishing rules and regulations promote sustainable Barramundi fishing practices.
7
3.3
The ease of communicating with NT Fisheries and peak bodies such as AFANT (e.g., when you have a query about regulations, fish size, bag...
8
2.8
The opportunity you have to be involved in the decision-making process regarding recreational Barramundi fishing rules and regulations.
8
2.2
The range of other fish species available for you to catch.
7
1.7
The existing recreational Barramundi fishing regulations in your area.
7
1.1
The availability of Barramundi in your preferred fishing spots.
6
0.0
2.0
4.0
6.0
8.0
10.0
12.0
Satisfaction Rating
Importance Ranking

Insights gained

- Potential to replicate this case study in another jurisdictions for another fishery, compares the outcomes, and refine the methodology.
- With this experience, further potential to undertake similar studies across Australia.

Project to Date

Project Progress



Detailed fieldwork timing

Sample Source	Timing	Notes
Boat Ramp Intercepts	Conducted in both 2023 (October/November) and 2024 (April/May)	Those who participate in the boat ramp intercept will be approached to participate in the main survey shortly afterwards (hoping within 7 days of the intercept capture)
Online Research Only Panel	50% conducted in 2023 (November) 50% conducted in 2024 (April)	
Telephone Interviewing	50% conducted in 2023 (November) 50% conducted in 2024 (April)	Random household telephone calls
AFANT Database and/or social media promotion	Conducted in 2024 (April / May)	
NTGFIA Database and./or social media promotion	Conducted in 2024 (April / May)	
NT Fisheries survey promotion	Conducted in 2024 (April / May)	
Barra Competitions survey promotion	Conducted in 2024 (April / May)	Barra Nationals, and Girls Gone Fishin'

https://actionsurveys.com.au/index.php/251913?lang=en

Due Date	Details	Budget Justification
3/07/2023	Contract commencement.	Contract commencement.
30/08/2023	Summary report of the literature review key findings. Summary report of the inception meeting outcomes. Detailed research methodology documented. Qualitative research report.	- Comprehensive literature review undertaken, and key findings documented. - Inception meeting with advisory group and key stakeholders held and meeting outcomes documented. - Research methodology as discussed and agreed with the advisory group documented. - Five focus group undertaken and a report of the findings which will be used to inform the quantitative research phase prepared.
15/09/2023	Stop-go-point to allow the FRDC Human Dimensions Research Coordination Program to review the resultant survey/design to ensure (i) that it is fit for purpose, and (ii) sampling is representative for the barramundi fishery.	No impact on budget.
3/06/2024	Quantitative research (survey) report prepared.	- Sampling approach determined. - Questionnaire(s) developed. - Survey piloted. - **Fieldwork undertaken – CURRENTLY IN PROGRESS** - Data collated. - Data analysed. - Data interpreted. - Report prepared.
1/08/2024	Final draft report prepared.	Draft report consolidating the information gathered from the literature review, the qualitative research, the quantitative research plus the interpretation of that information to enable NT Fisheries to integrate recreational fisher experience/satisfaction into decision making is prepared.
1/10/2024	Final report prepared.	The draft final report is edited following feedback received and the final report is prepared.

Consultation

- Inception Meeting & Focus Groups
- Extension to Daly River
- Comms & Media

Products

- The AFANT static web page is now live: https://afant.com.au/nt-recreational-fishing-experience-survey/ and a button has also been added to the top of the AFANT home page.
- David and Jo have also completed the following social media / mailout:
  - Media Release's sent to stakeholder list (around 1300)

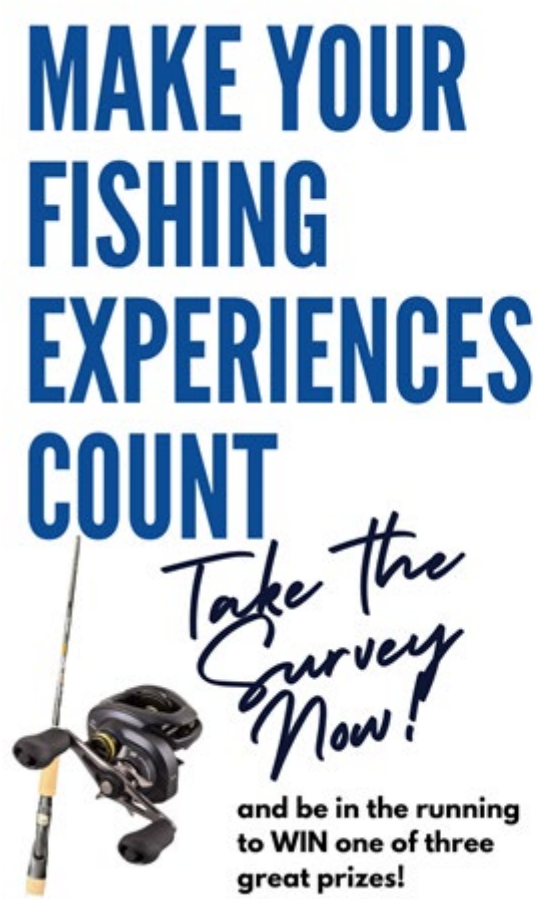
    https://createsend.com/t/d-A26B331C966890CB2540EF23F30FEDED
  - Facebook Post:

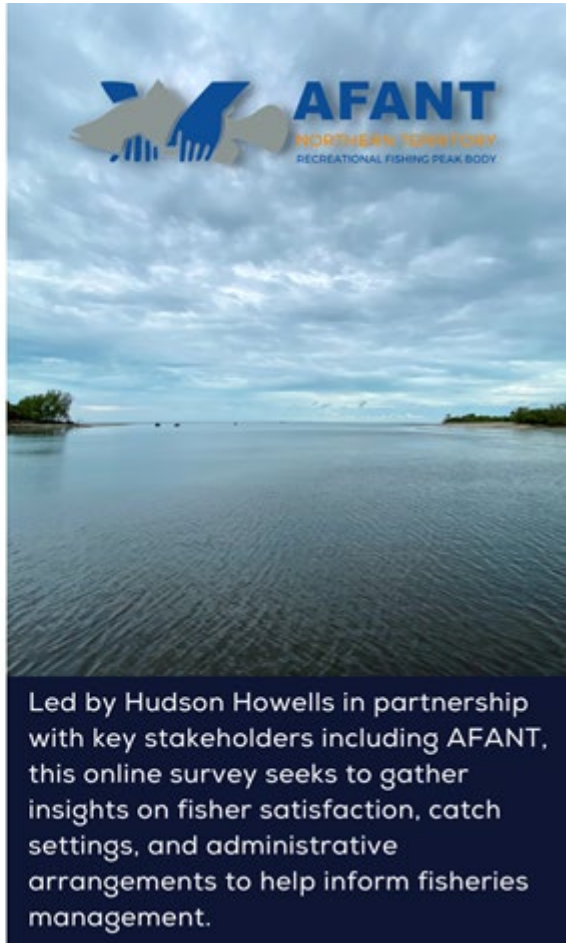
    https://www.facebook.com/AmatuerFishermenNT/posts/pfbid02SxVZh2ptXEXNHrhGDwjnWgkWa9PcTqbcsAMkQMzQjkp6rchnEaYrg3wKdK3eD36tl
  - Instagram Story:

    https://www.instagram.com/stories/afant_official/3232025726614522690/
  - Instagram Post

    https://www.instagram.com/p/CzadSviS2qa/
  - LinkedIn:

    https://www.linkedin.com/feed/update/urn:li:activity:7128219999109857280
- Two different survey links are being used to track responses via the web and media release.
- David also recorded a radio news story for Mix 104.9 and Hot100 FM which aired on news bulletins early November 2023.





Project Challenges / Changes

- HDR / stop gap was pivotal to staying on track
- Modifications to projects based on fisher feedback
- Linkage to National Review of Harvest Strategies


Questions?

Development of an engagement strategy for Indigenous fishing interests with a focus on the Commonwealth FRDC Project 2021-024

- Dr Nick McClean, Climate Society and Environment Research Centre, UTS.
- Stephan Schnierer, Independent fisheries researcher.
- Prof Daryle Rigney, Jumbunna Institute for Indigenous Education and Research.
- A/Prof Steve Hemming, Jumbunna Institute for Indigenous Education and Research.

Need for an engagement strategy

Amendments in 2017 to the Fisheries Management Act added the clause that AFMA

> *"in the performance of its functions, is to have regard to the objective of ensuring that the **interests** of commercial, recreational and **Indigenous fishers** are taken into account."*

The primary purpose of the UTS project is to respond to this broad need to advance engagement in light of this obligation, and provide options for advancing engagement with Indigenous interests in Commonwealth fisheries.

To support this, we developed a **Statement of Commitment** in which DAFF and AFMA Executive articulated where they felt potential progress could be made, and how they would utilise the results of this research, broadly speaking.

UTS UNIVERSITY OF TECHNOLOGY SYDNEY

Trial of an Indigenous fisheries technical working group with a focus on Commonwealth harvest strategy and bycatch policies

Background and rationale

Opportunity

- → Need to consider the role and value of an advisory/reference group in the context of Cth fisheries management.
- → Govt seeking Indigenous input into the current review of Commonwealth Harvest Strategy Policy, and Commonwealth Bycatch Policy.

What did we do?

- → Convened a group of 8 experts to consider how these policies can be updated to address Indigenous rights, interests and objectives, with wider engagement and consultation with a wide range of Indigenous organisations feeding into this.
- → Mix of Indigenous and non-Indigenous participants (latter based on specific technical needs/knowledge). When there were different views, Indigenous members views were given weight and non-Indigenous members provided advice on technical and practical feasibility.
- → Over a 6 month period (April-October 2023), this group met regularly online and for a 1 day face-to-face workshop.

Overview of recommendations

Developed a comprehensive set of initial recommendations covering

- **Standards** around engagement – referencing EPBC Act and international standards.
- **A process** for demonstrating the standard has been met.
- Developed a set of **default principles** most likely to address Indigenous objectives and outcomes.

    → Resource access

    → Populations levels and biomass limits/targets

    → Impacts on important species and culturally sensitive areas

Overview of recommendations

- Specifically re Harvest strategies: Some Torres Strait and NSW fisheries have good examples of harvest strategies co-developed with Indigenous groups or addressing Indigenous objectives.
- **There is progress and a HS can address some (but not all) needs → resource allocation issues critical to progressing relationships with Indigenous nations.**
- Intention is to release these recommendations and our wider draft strategy early in 2023. Your input will be highly valued. **Stay tuned.**

Advisory groups “Not a one stop shop”

Advisory and reference groups have a role to play, especially in highly technical fields such as fisheries management.

However there are wider needs around representation and consultation that these groups cannot perform.

“Not a one stop shop”

Approaches for incorporating Indigenous Rights, practices and catch into resource sharing and harvest strategy frameworks, based on international experience. FRDC 2022-036

- Dr Nick McClean, Climate Society and Environment Research Centre, UTS.
- Stephan Schnierer, Independent fisheries researcher.
- Prof Daryle Rigney, Jumbunna Institute for Indigenous Education and Research.
- A/Prof Steve Hemming, Jumbunna Institute for Indigenous Education and Research.

What will we do?

- Literature review and interviews with people in the field in Australia, and then in international space.
- Connect with First Nation groups overseas for priority/strategic case studies.
- 3 focus areas:
  1. Fisheries agreements/arrangements
  2. Legal/political/policy context
  3. Community social and economic development context

Fisheries agreements/arrangements

- Technical aspects of examples of including Indigenous **rights, practices and catch** in inter-sectoral **allocation, harvest strategy** development, and other relevant fisheries management processes.

- What are the specific processes, agreements, collaborations, and partnerships that form the substance of the arrangement in each case? How do they operate in the context of the fisheries management system in each case, to deliver meaningful outcomes for Indigenous communities?

Legal/political/policy context

- Broader **political, constitutional, legal, legislative and policy processes** that have **constrained or enabled progress** towards effectiveness of Indigenous involvement in fisheries.
- This includes specific consideration of, for example, treaty based processes, and examples where the implementation of international instruments in domestic policy and legislation is occurring in ways that impact materially on Indigenous involvement in fisheries (this is an important development in current progress in North America and Arctic areas especially, and an area where Australia has lagged to date

Community social and economic development context

- What are the **qualities, characteristics and histories of communities** who have been able to successfully negotiate their involvement in fisheries management, to deliver outcomes for their people? What elements of local community life, and of social and economic development in communities, support **effective negotiation and delivery of outcomes** for these communities via involvement in fisheries?

Linkages to policy and management

- We are keen to make this work relevant to your jurisdictions and integrate into policy processes
- Developing explicit linkages to HS guidelines work and other cross-jurisdictional efforts, for example National Fishing Plan, would be a highly valuable step forward for us.
- Are there specific issues and questions you would be keen for us to address? If so, let's discuss.
- **Noting that in an Indigenous context, developing commitments around how research will be utilised can greatly enhance the level and quality of engagement.**

QUESTIONS, DISCUSSION

Department of Regional NSW
Department of Primary Industries

FRDC
FISHERIES RESEARCH AND DEVELOPMENT CORPORATION

National Guidelines Review

FRDC 2021-135
13 December 2023

NSW GOVERNMENT

dpi.nsw.gov.au

Department of Regional NSW
Department of Primary Industries

Contents

Project overview

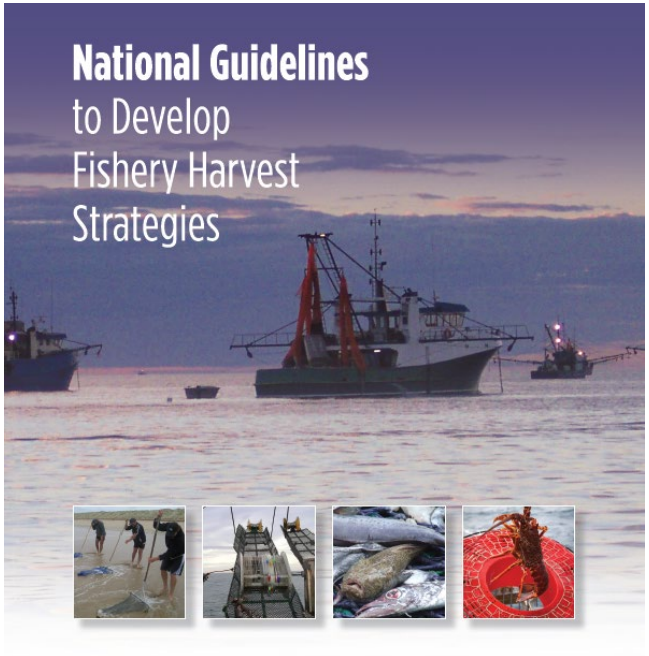
Review of National Guidelines to Develop Fishery Harvest Strategies

Department of Regional NSW
Department of Primary Industries

National Guidelines to Develop Fishery Harvest Strategies

FRDC Project No. 2010/061
Published in 2014

Developed to “provide a national framework to support a consistent and more harmonised approach to harvest strategy development across Australian fisheries jurisdictions”.



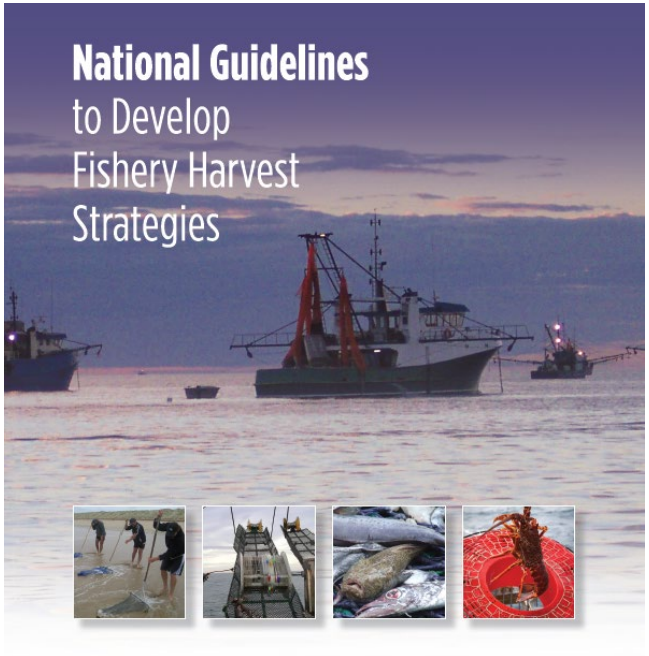
Department of Regional NSW
Department of Primary Industries

National Guidelines to Develop Fishery Harvest Strategies

Project objectives:

1. Undertake a review and analysis of the present situation of harvest strategies in Commonwealth and State-managed fisheries.
2. Develop a common definition for nationally consistent harvest strategies.
3. Develop an agreed set of over-arching principles for Harvest Strategies across Australia

Focus on providing practical technical assistance to Government for developing harvest strategies with a consistent and harmonised approach.

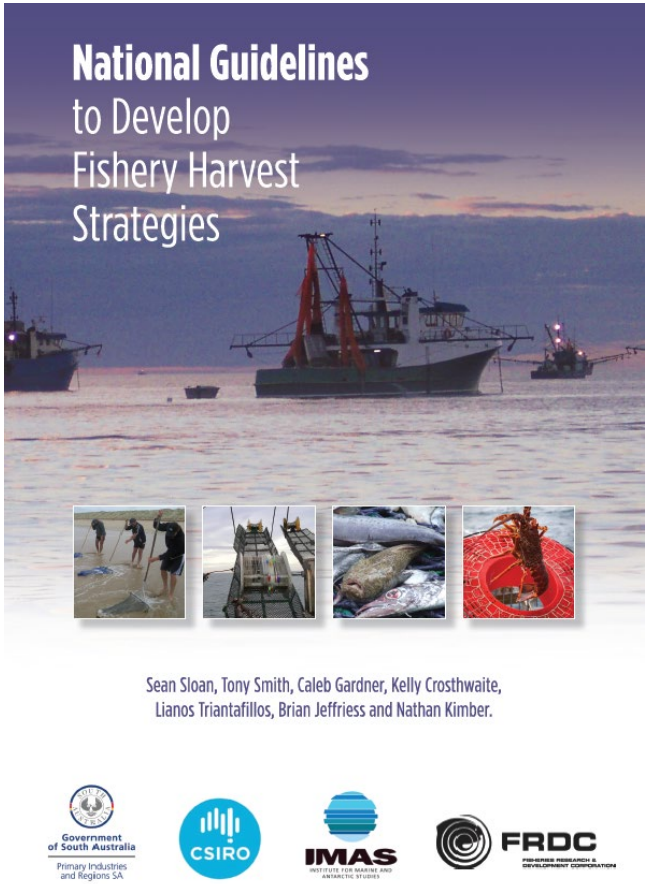


National Guidelines to Develop Fishery Harvest Strategies

The National Guidelines include:

- A national harvest strategy definition
- A description of the key elements of a harvest strategy
- A set of harvest strategy design principles
- A harvest strategy design process (the key steps to be followed)
- Considerations for specific fishery scenarios

"A harvest strategy is a framework that specifies the pre-determined management actions in a fishery for defined species (at the stock or management unit level) necessary to achieve the agreed ecological, economic and/or social management objectives".



National Guidelines Review

FRDC Project No. 2021-135

Objectives:

1. To review the National Guidelines to Develop Fishery Harvest Strategies (2014) to ensure the National Guidelines are consistent with current harvest strategy utilisation and reflect the most up to date information available,
2. To take stock of harvest strategies in Australia and internationally (by jurisdiction), including how many fisheries now have operational harvest strategies adopted and those under development,
3. To produce a report with the updated National Guidelines coupled with a detailed communication plan to promote the outcome of the review.

National Guidelines Review

Project contributions:

- Principle investigator: Sean Sloan, Deputy Director General DPI Fisheries
- Co-investigators and facilitation: Tony Smith, Caleb Gardner, Ian Knuckey, Nicholas Giles (PO)
- Australian Fisheries Management Forum (Steering Committee)
- Working Group (Jurisdiction representatives)
- ASFB Fisheries Management Committee
- Key stakeholders (MSC, SIA, ARFF, IRG)

National Guidelines Review

Key components:

- Technical Review (Commonwealth): Review of current science and economics research, advice on improvement
- Desktop Review: Assessing status of harvest strategies and key issues, including revisiting previous survey
- Two Working Group meetings (online)
- ASFB Committee workshop
- Key stakeholder workshops
- Two National Workshops
- Revised National Guidelines
- Review Report
- Communications package

National Guidelines Review

Project Component	Scheduled (In review)
Harvest Strategy Technical Review	In train
Working Group Workshop 1 (Online)	28 July 23
ASFB Workshop (Online)	1 September 23
Key Stakeholder Workshops	Early 2024 (TBC)
National Workshop 1 (F2F)	TBC
Contemporary Review of Harvest Strategy Development and Implementation (Desktop Review)	Developing from workshops and surveys
Working Group Workshop 2	TBC
National Workshop 2 (F2F)	TBC
Draft Report	Late 2024 (TBC)
Final Report	Late 2024 (TBC)
Communications package	Late 2024 (TBC)

National Guidelines Review

Common issues

- Appropriate resourcing, investment and cost recovery
- Improving data, particularly non-commercial
- Stakeholder engagement, education and support – development and operational
- Reviewing the role of HS in context of wider management issues/frameworks
- Policy pre-requisites e.g. approach to resource sharing
- Operationalising economic or social objectives
- Assessment and response to environmental changes
- Structured approach to exceptional circumstances (e.g. price/market changes)

Issue area	Issues
Policy/process	• Harvest Strategy objectives – What should be included vs managed externally (e.g. Allocations, TEPS/Bycatch) • Policy pre-requisites to support effective harvest strategy development (e.g. Resource sharing and allocation, bycatch) • Determining clear, concise harvest strategy objectives • Managing uncertainty and risk • Approach for Harvest strategies vs Recovery plans • Changing management targets (e.g. from higher to lower) • Linkage to SAFS status for management targets (i.e. status above limit reference points) • Supporting harvest strategy development with available tools (e.g. FishPath) • Interaction and cumulative impact of key issues • Managing fishery resources rather than fisheries or sectors • Managing carryover in ITQ fisheries • Retrofitting harvest strategies to existing frameworks
Access/Allocation	• Managing harvest and certainty in open access fisheries • Improving data to support allocation and management • Interim vs formal allocation arrangements • Managing uncertainty and data issues • Approach to re-allocation/s • Cultural/traditional data, objectives and management • Conflicting targets (jurisdiction/sector/method/species) • Applying decision rules to non-commercial sectors
Stakeholder support	• Education and benefits of harvest strategies, including support measures (e.g. material, videos) • Best practice and available guidelines for stakeholder engagement • Managing opposition to application of agreed decision rules
Spatial	• Spatial squeeze (e.g. Windfarms, Oil and gas), including effects on monitoring, assessment and management response • Assessment and management of sessile/spatially distributed species
Trade-offs	• Stability vs adapting to changing/exceptional circumstances • Determining and balancing management targets for commercial and non-commercial sectors • Cost/catch/benefit for investments in research or management, including cost recovery and ability to pay
Environment/Climate change	• Managing wider issues including environmental or climate changes • Shifting assessment baselines e.g. dynamic B0 and changes to environmental composition or carrying capacity
TEPS/Bycatch/Non-target	• Scaling harvest strategies and role appropriately for monitoring and managing wider fishery issues

Questions or discussion