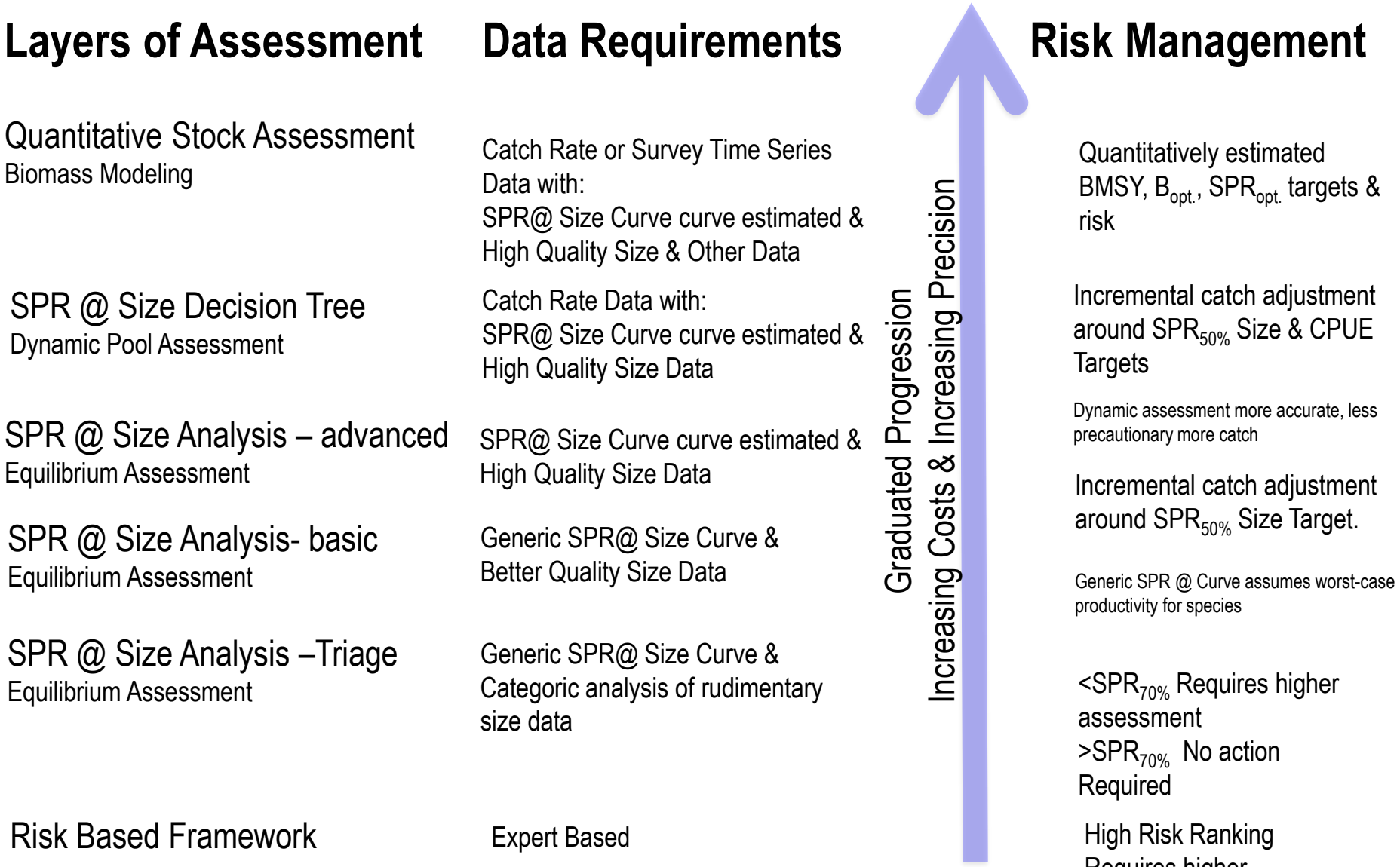
DLM Frameworks



The Risk – Catch – Cost Framework

Source: Prince (pers. comm.)

Data-limited frameworks

Umbrella approaches with the following traits

- Helps organize data-limited approaches
- Directional- as data improves, further methods are unlocked
- Links methods to management via harvest control rules
- Includes governance or socio-economic dimensions

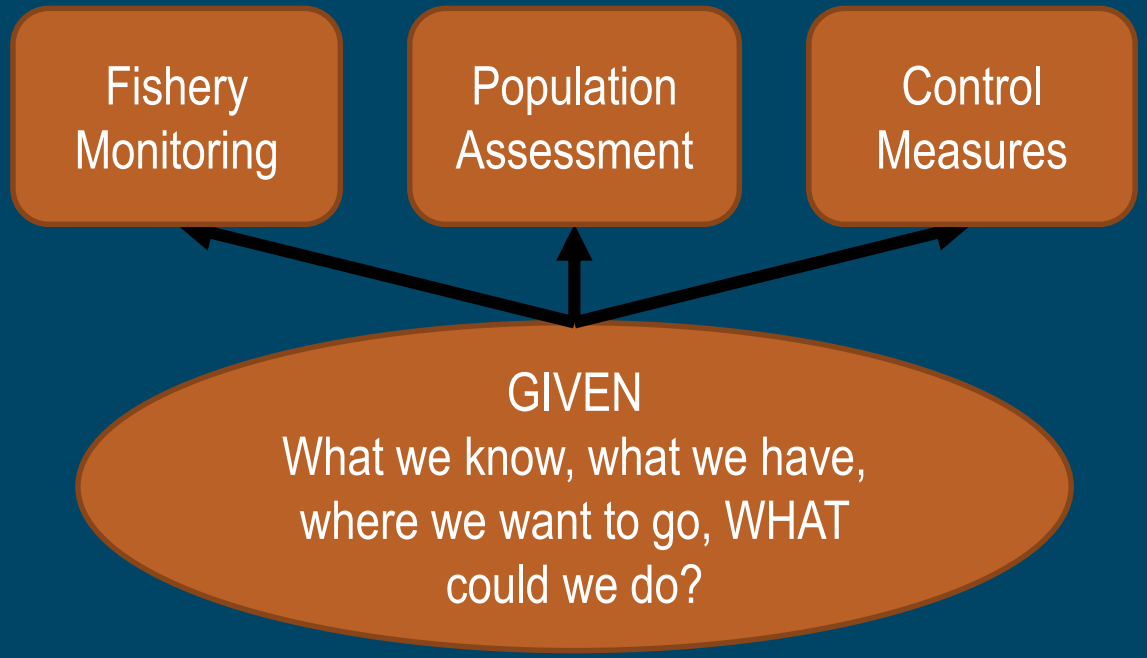
Examples

- Framework for Integrated Stock and Habitat Evaluation (FISHE; http://fishe.edf.org/)
- Rapfish (http://www.rapfish.org/)
- FishPath (http://snappartnership.net/groups/data-limited-fisheries/)

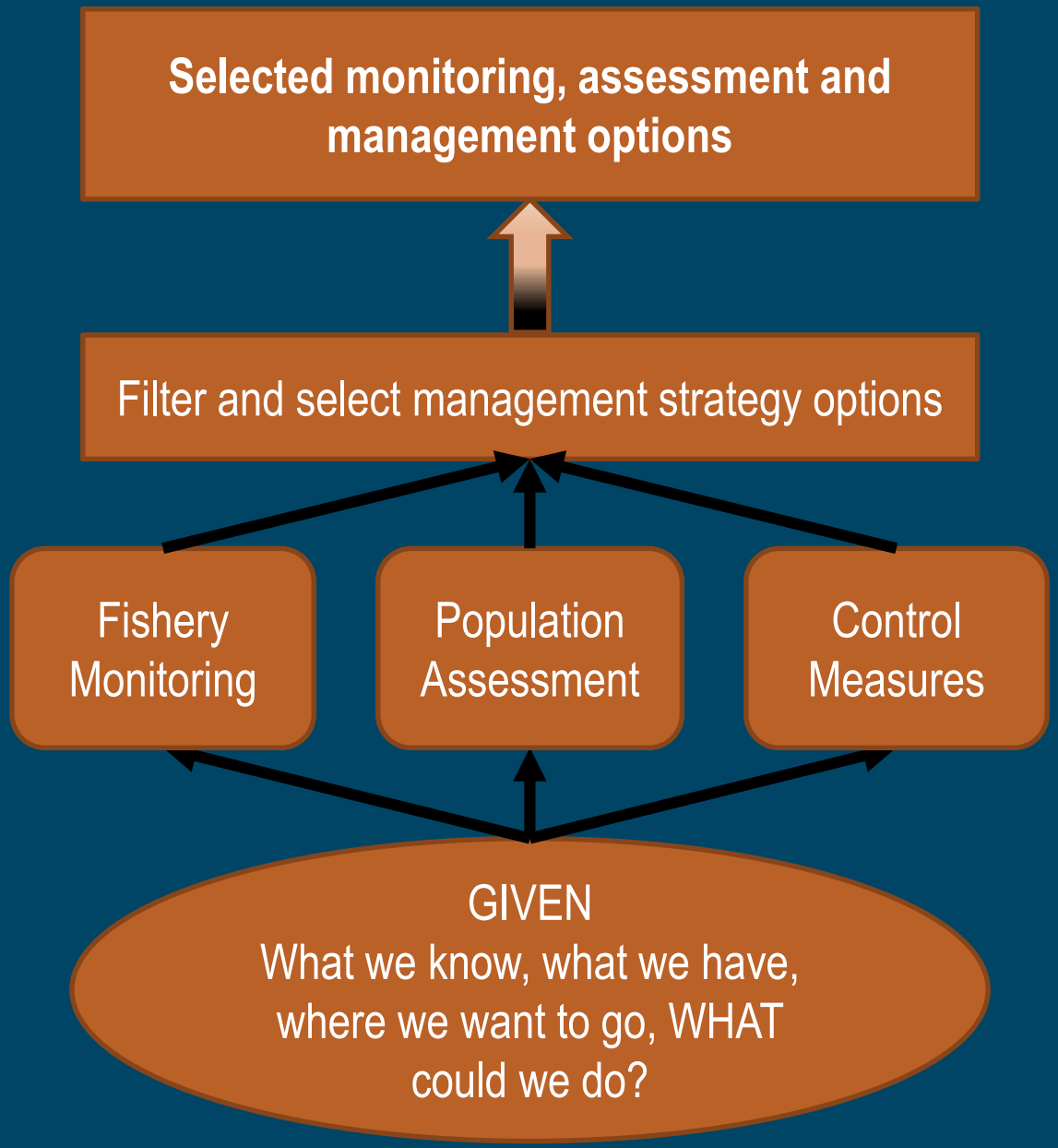
FishPath: a roadmap to managing fisheries

GIVEN
What we know, what we have, where we want to go, WHAT could we do?

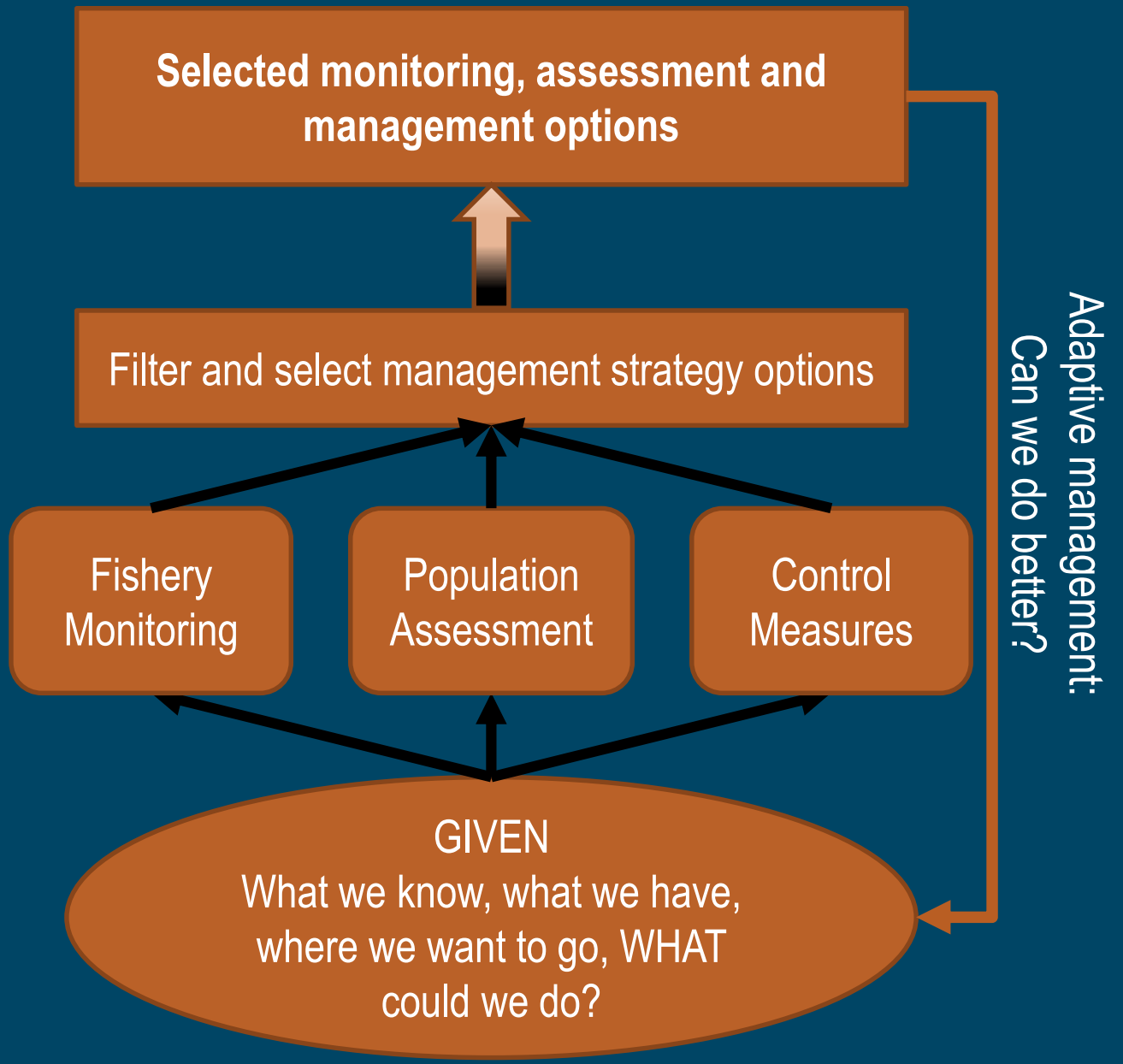
FishPath: a roadmap to managing fisheries



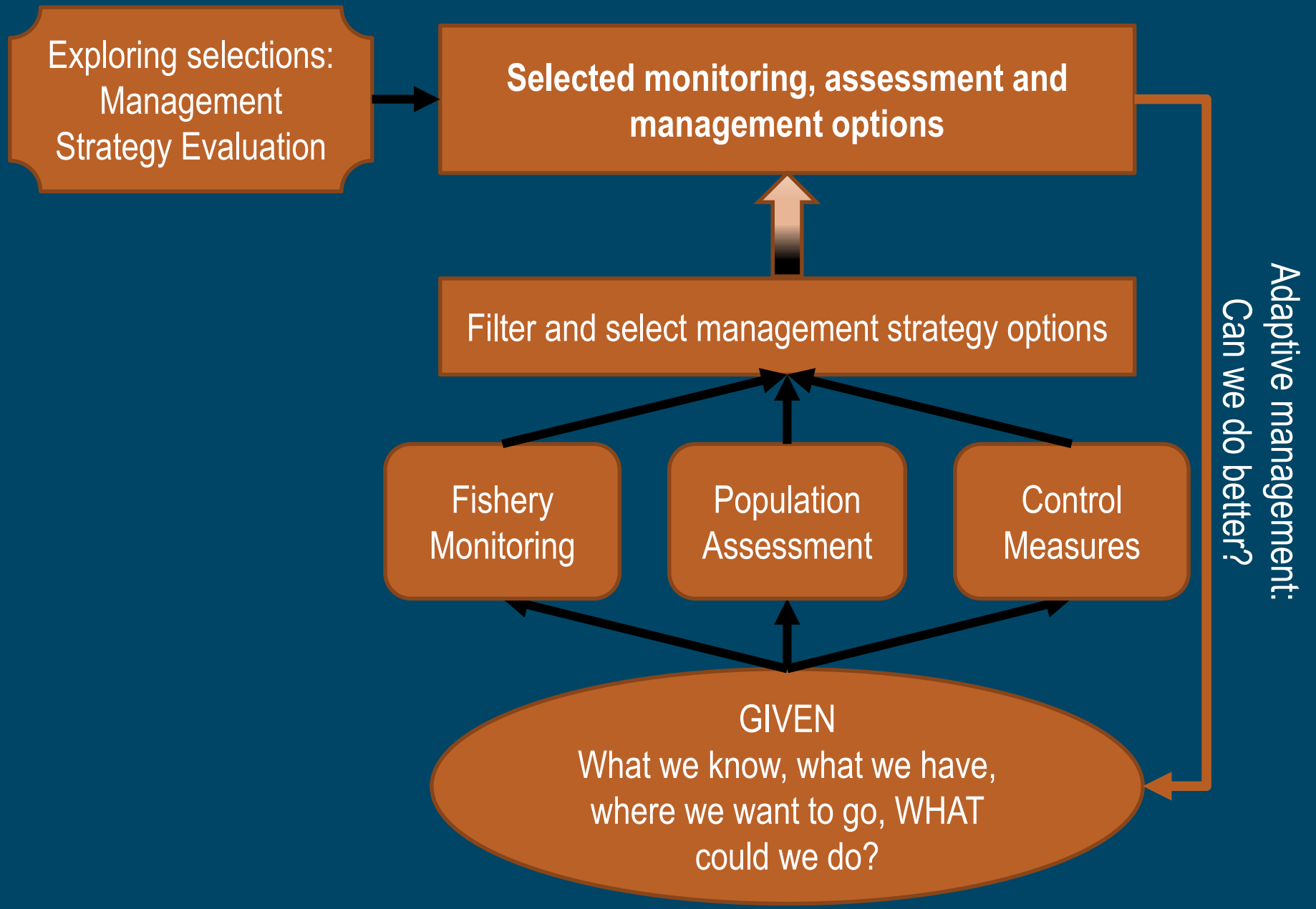
FishPath: a roadmap to managing fisheries



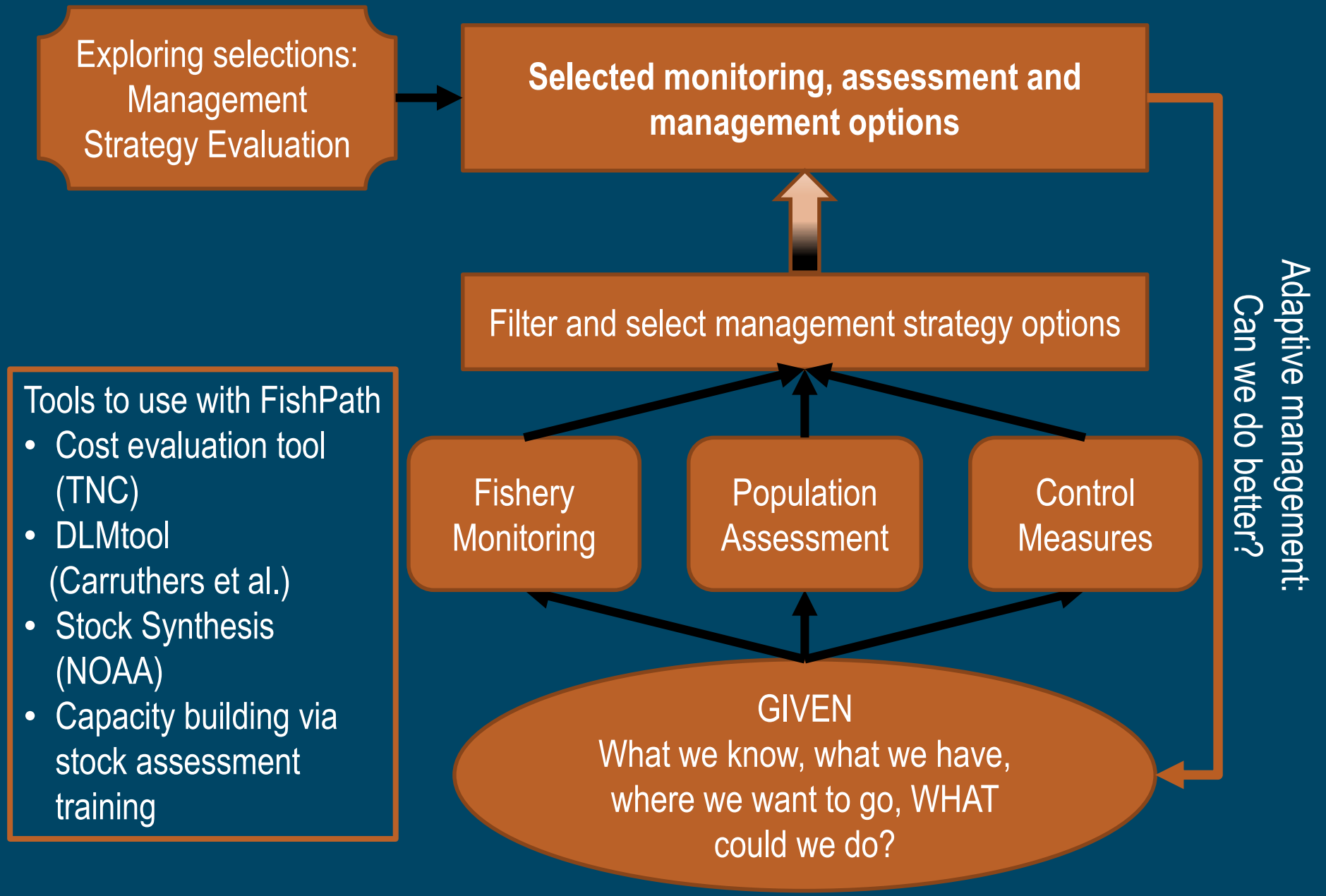
FishPath: a roadmap to managing fisheries



FishPath: a roadmap to managing fisheries



FishPath: a roadmap to managing fisheries



FishPath: Fishery diagnosis questionnaire & cost estimator

Cost to do management

Monitoring Module

OPTIONS

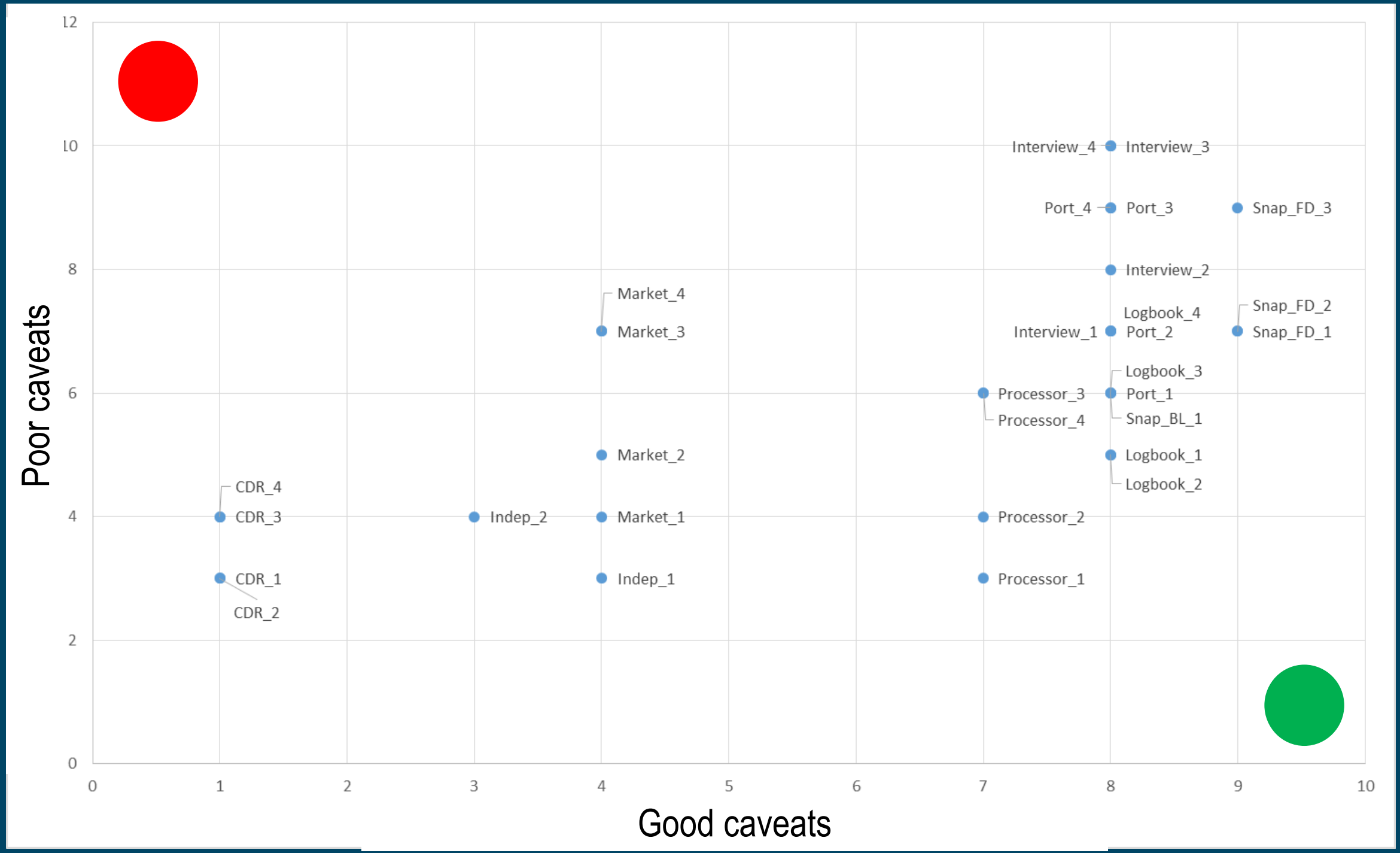
1. Market surveys
2. Port monitoring
3. Processor monitoring
4. Interviews
5. Data gathering - fishery dependent
6. Data gathering - biology/life history
7. Independent surveys – by fishers
8. Independent surveys – external
9. Automated information gathering
10. Logbooks – formal
11. Logbooks - informal
12. Catch disposal records/sales dockets
13. Observers

CRITERIA

- Gross value of production
- Subsistence to commercial
- Level of cooperation
- Research/institutional capability
- Willingness to invest in data gathering

CAVEATS

Given the answers to the criteria, how well do each option fit?


Poor caveats
Good caveats
12
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Interview_4
Interview_3
Port_4
Port_3
Snap_FD_3
Interview_2
Market_4
Logbook_4
Snap_FD_2
Market_3
Interview_1
Port_2
Snap_FD_1
Logbook_3
Processor_3
Port_1
Processor_4
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Market_2
Logbook_1
Logbook_2
CDR_4
CDR_3
Indep_2
Market_1
Processor_2
CDR_1
Indep_1
Processor_1
CDR_2

"Assessment" Module

OPTIONS

Nine groups

1. Expert judgment
2. Risk analysis/Vulnerability
3. Empirical reference points
4. Multiple indicators
5. Life history based reference points
6. Size/age-based approaches
7. Catch only
8. Abundance indicators
9. Population dynamic models

- Currently almost 50 options available

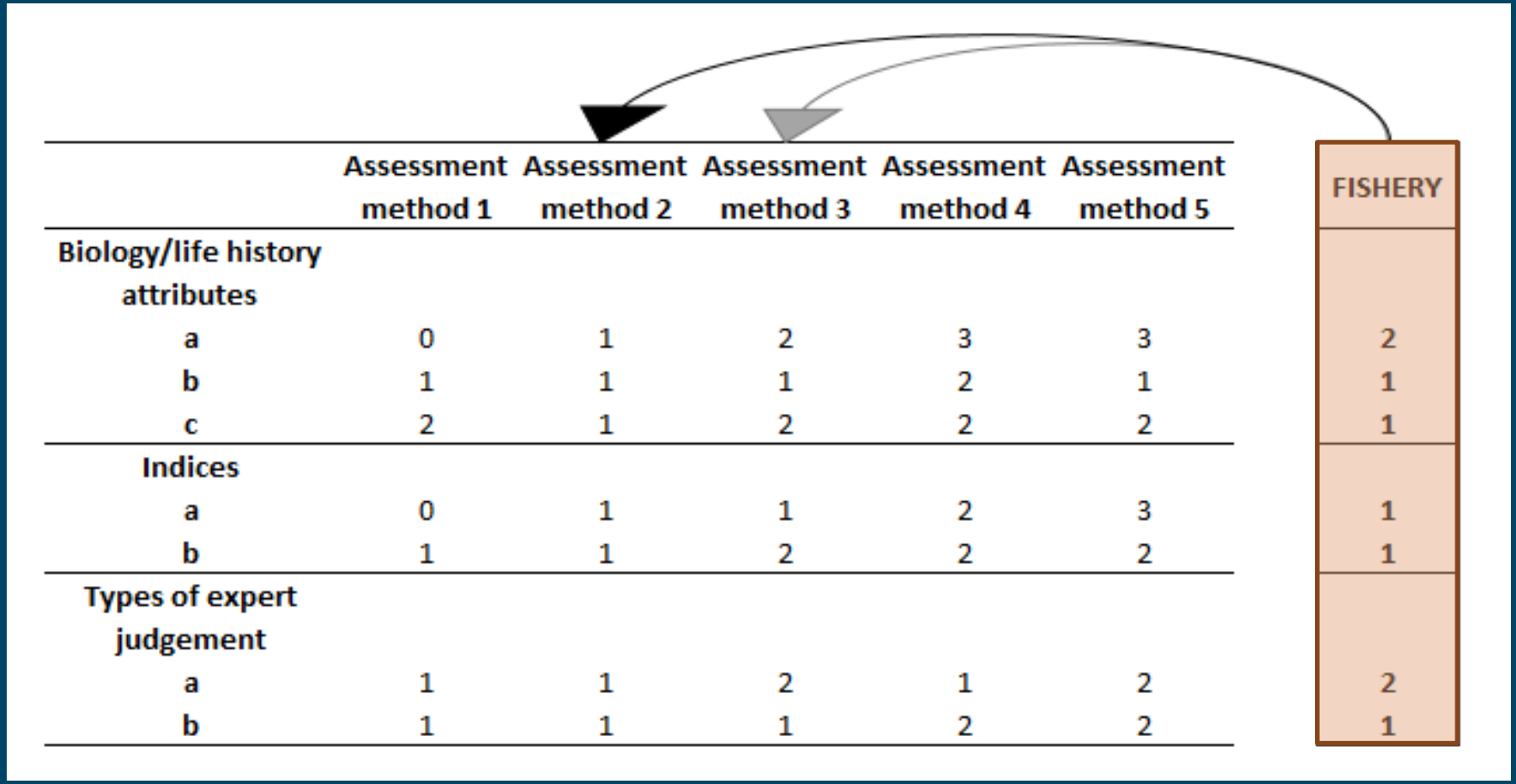
CRITERIA

- Indices/data
- Life history/biology
- Expert judgment

CAVEATS

Given the answers to the criteria, how well do each option fit?

"Assessment" Module: Matching methods to information



	Assessment method 1	Assessment method 2	Assessment method 3	Assessment method 4	Assessment method 5	FISHERY
Biology/life history attributes						
a	0	1	2	3	3	2
b	1	1	1	2	1	1
c	2	1	2	2	2	1
Indices						
a	0	1	1	2	3	1
b	1	1	2	2	2	1
Types of expert judgement						
a	1	1	2	1	2	2
b	1	1	1	2	2	1

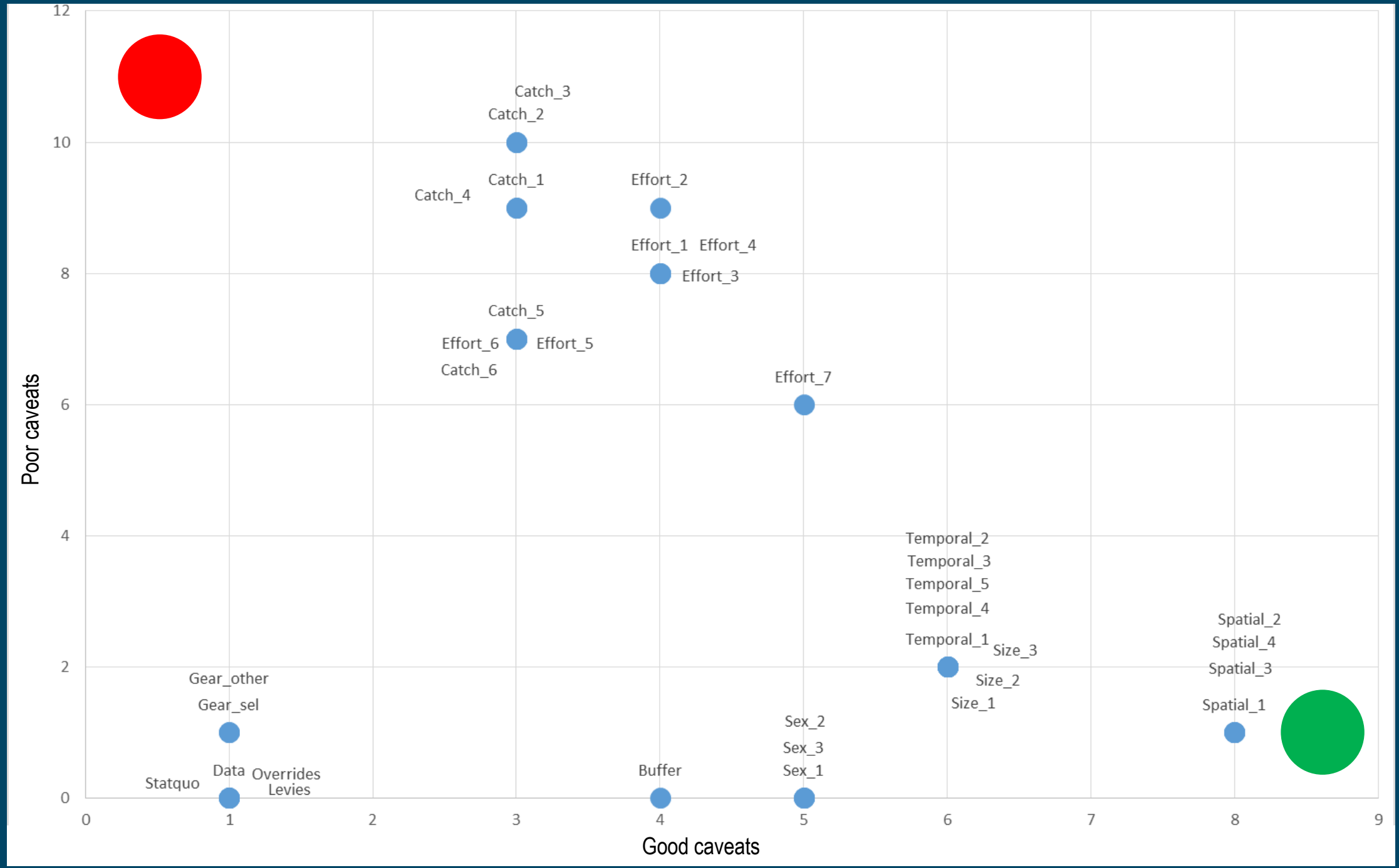
Matching will identify best fitting methods along with their caveats

Control Methods

- No one "solution"
  - Some rules more or less appropriate under certain circumstances
  - Multiple decision rules could (often, should) be applied

- What decision rules should be
  - ruled out?
  - particularly recommended?

- 13 control rule "families":
- Considers ~40 criteria
- Caveats


Poor caveats
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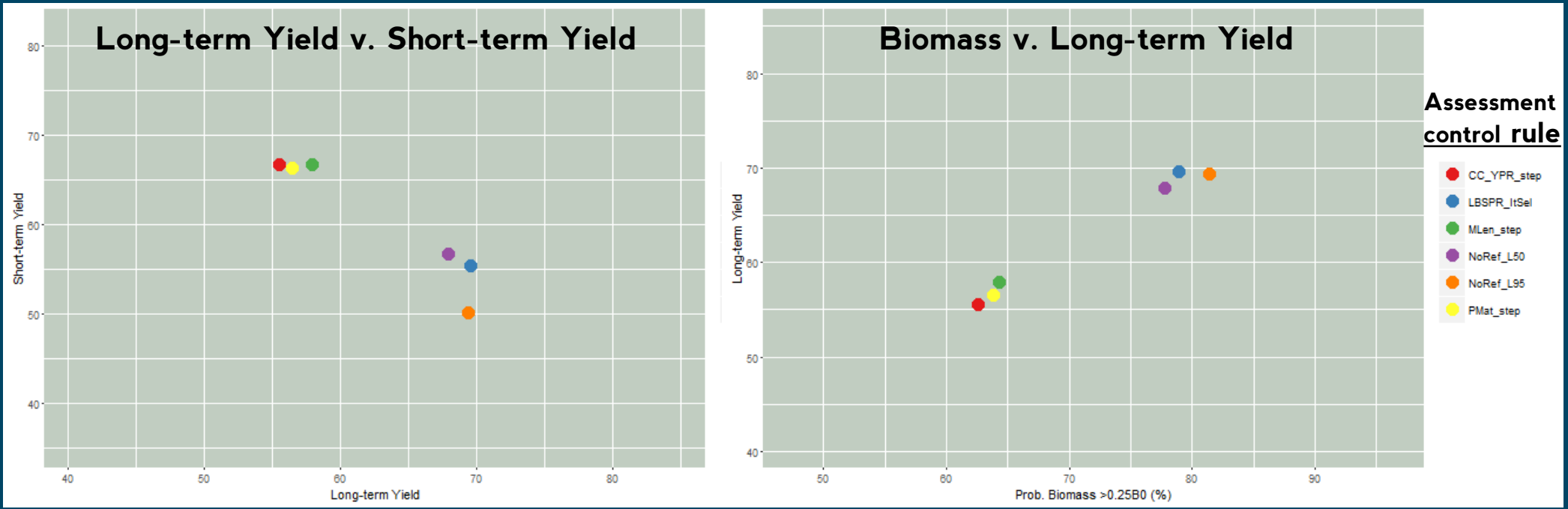
Catch_3
Catch_2
Catch_1
Catch_4
Effort_2
Effort_1
Effort_4
Effort_3
Catch_5
Effort_6
Effort_5
Catch_6
Effort_7
Temporal_2
Temporal_3
Temporal_5
Temporal_4
Temporal_1
Size_3
Size_2
Size_1
Spatial_2
Spatial_4
Spatial_3
Spatial_1
Gear_other
Gear_sel
Statquo
Data
Overrides
Levies
Buffer
Sex_2
Sex_3
Sex_1

Management Strategy Evaluation:

Given the "assessments" and the control rules identified by FishPath, how do they perform?



Analytical tool: DLMtool (Carruthers et al. 2014)

Adaptive management via FishPath

- Allows exploration of changing monitoring and data availability
- Demonstrates how assessment and control rule options would change
- Can lead to speculative MSE for each of the above changes
- Results may help prioritize future monitoring, data collection and management