Evaluating Canada's progress towards the 2020 Aichi Biodiversity Targets

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National Data Integration and Scenarios WG

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Social Sciences and Humanities Research Council of Canada

Conseil de recherches en sciences humaines du Canada

Canada

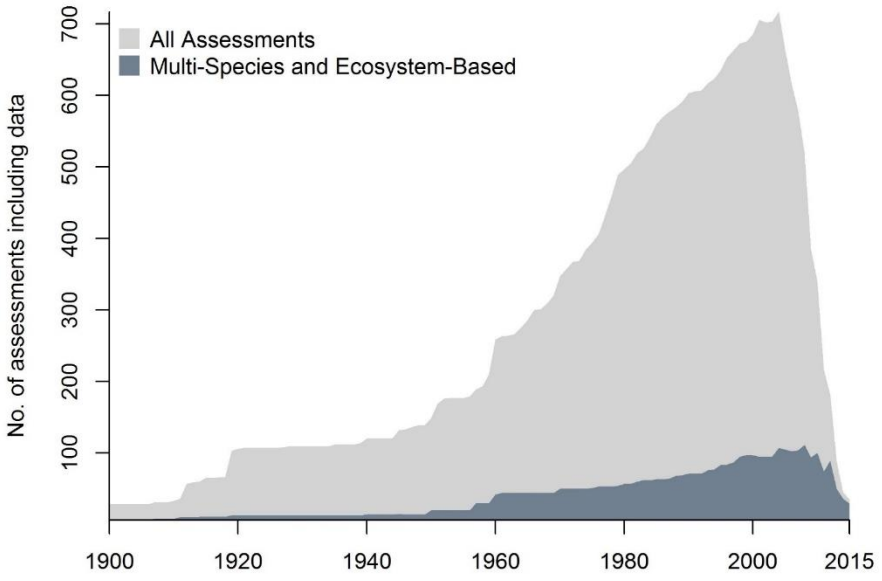
Outline

- Metadata repository of marine resources in Canada;
- Aichi Biodiversity Targets (ABTs);
- Fuzzy logic framework;
- Evaluating Canada's progress towards the ABTs.

Metadata database

- Approx. 1,100 records referencing 16,500 individual time series;
- Government (702), NGO (314), academic (50);
- Arctic (76), Atlantic (476), Pacific (430), National (83).

Temporal coverage



Topics

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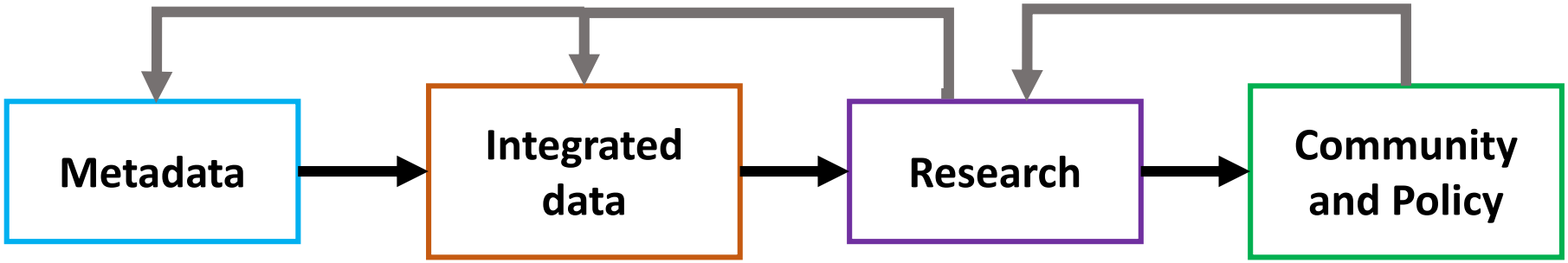
Cisneros-Montemayor et al. (in press) CJFAS

Building a living database

- Accessibility is key for metadata records and corresponding data;
- Build on existing repository efforts and research networks;
- Lead with examples of the framework in practice (e.g. MPA policy, climate change impacts on BC communities including FN, scenarios for Arctic).



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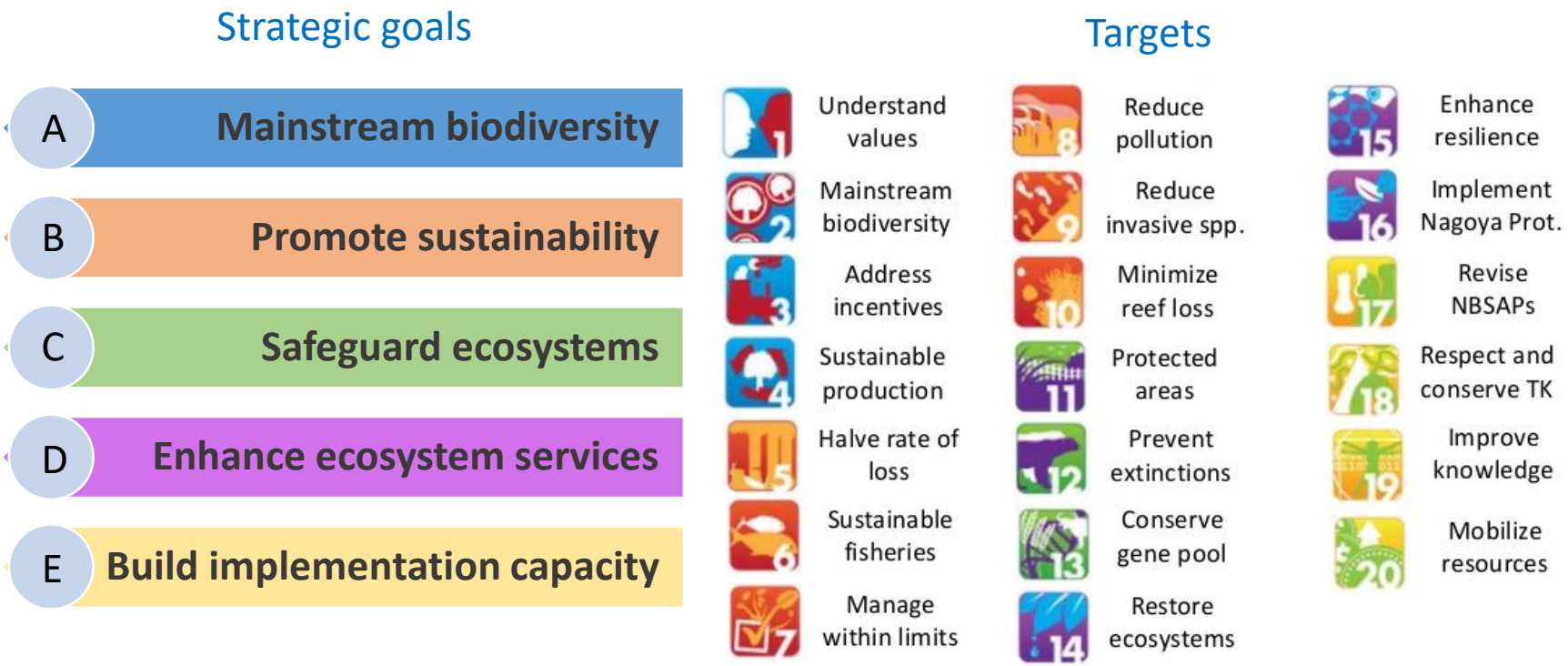
Aichi Biodiversity Targets

- Developed in 1993 by UN-CBD and mandated in Canada's Biodiversity Strategy;
- Promote sustainability through a range of strategies and benchmarks.



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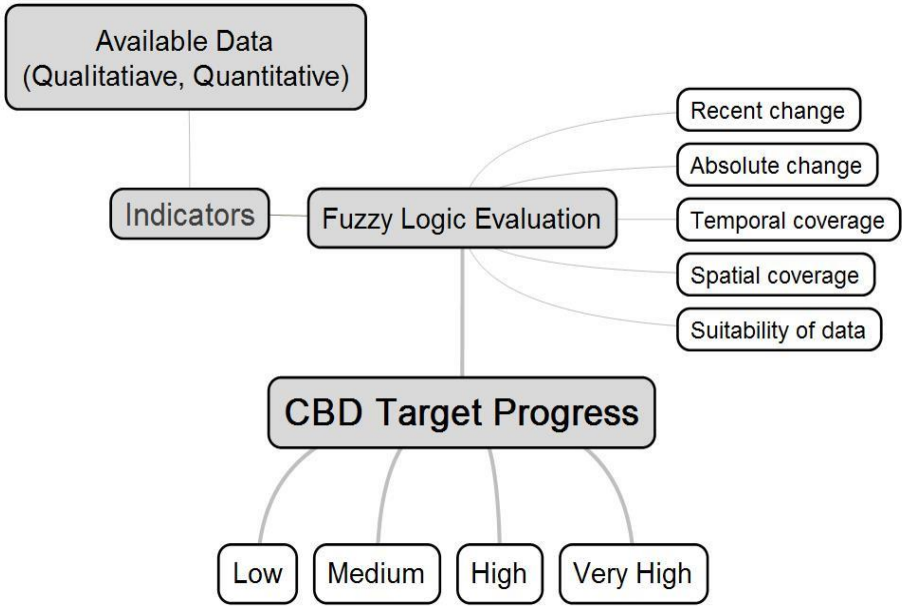
Evaluating biodiversity goals: fuzzy logic framework

- Lack of quantifiable objectives makes evaluating ABT progress difficult;
- Fuzzy logic is a formal quantitative approach to integrate data from diverse stimuli or inputs and evaluate a given problem (e.g. when should an AC start? How vulnerable are particular fish species to climate change?);
- In this case, the “problem” is progress towards the ABTs (marine realm), and the inputs are available indicators drawn from Canadian marine research.



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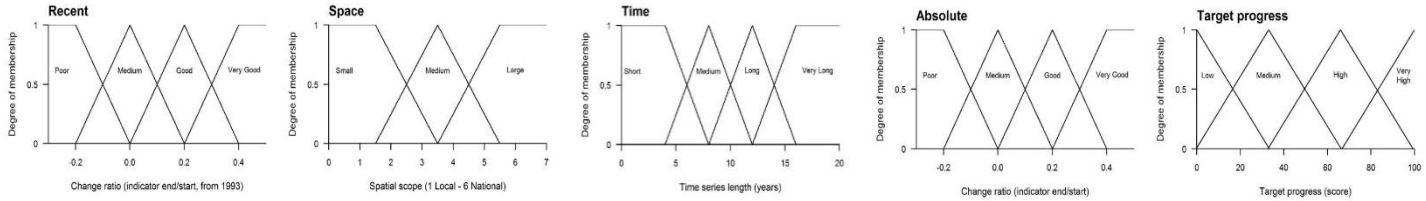
Evaluating biodiversity goals: fuzzy logic framework

Criteria	Set	Rules	Progress set
Recent state (ratio Δ since 1993)	Very good	+0.4 =< Δ	Very High
	Good	0 =< Δ < +0.4	High
	Medium	-0.2 < Δ < +0.2	Medium
	Poor	Δ =< 0	Low
Absolute trend (ratio Δ since initial data)	Very good	+0.2 =< Δ	Very High
	Good	0 =< Δ < +0.4	High
	Medium	-0.2 < Δ < +0.2	Medium
	Poor	Δ =< 0	Low
Time (years in time series)	Very long	12 =< Years	Very High
	Long	8 =< Years < 16	High
	Medium	4 < Years < 12	Medium
	Short	Years =< 8	Low
Space (local to national scope)	Large	Ocean or Nation	Very High
	Medium	Region or Province	High
	Small	Point location or Statistical Area	Medium
Suitability (as indicator for target)	-	Rank from 1 (medium) to 10 (excellent)	-



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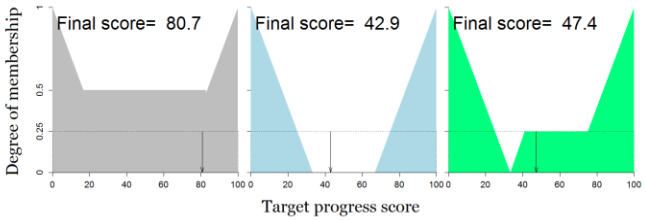
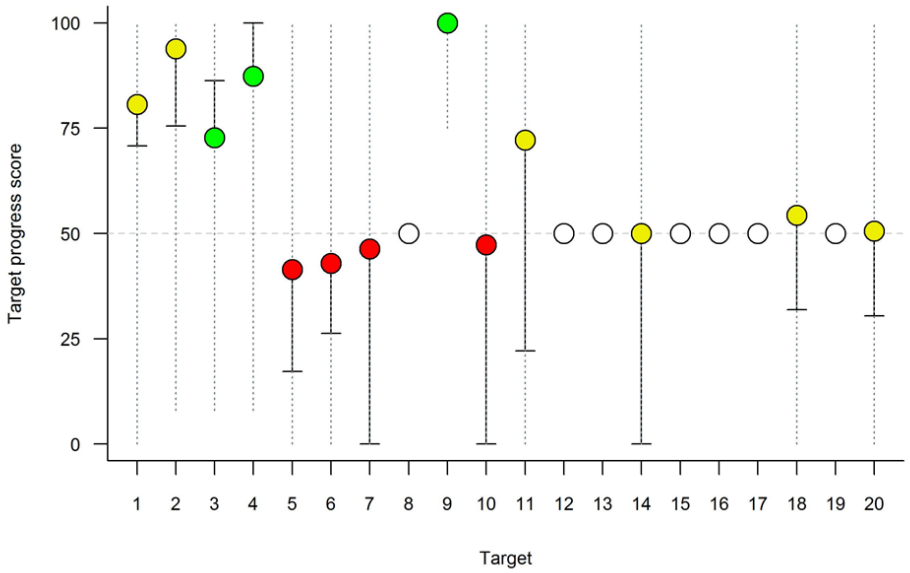
Next steps

- The 2020 Aichi Biodiversity Targets (ABT) are great goals for sustainability, yet difficult to evaluate;
- Fuzzy logic can incorporate multi-disciplinary criteria to assess ABT progress;
- The method can be adapted to assess progress towards other goals, globally or regionally;
- Selecting indicators to include in the fuzzy logic method requires multi-disciplinary collaboration.





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Thank you!

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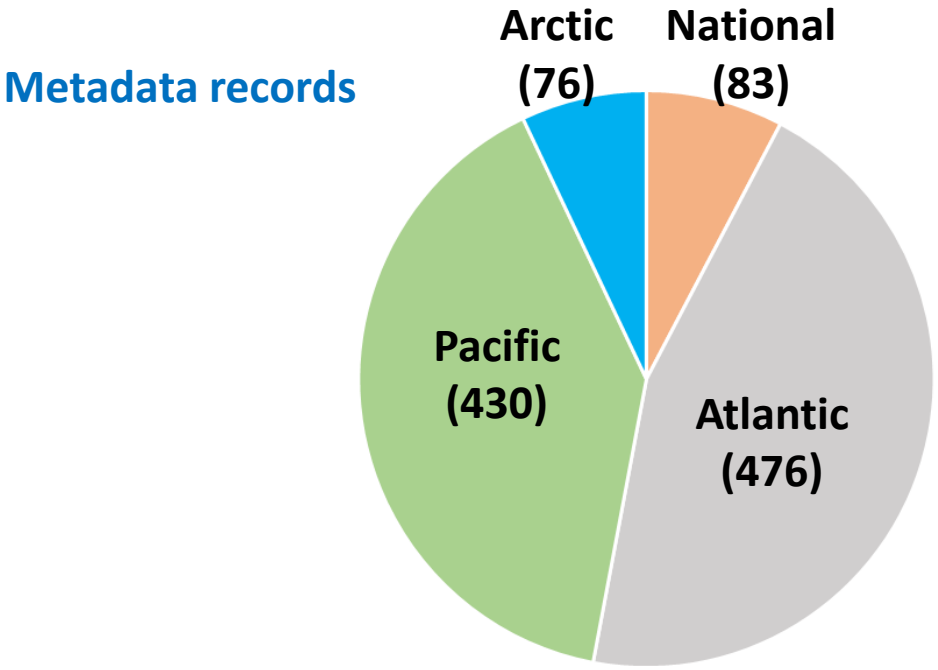
Metadata database

- Approx. 1,100 records referencing 16,500 individual time series;
- Government (702), NGO (314), academic (50);
- Coverage 1800s—, average 1979-2012.



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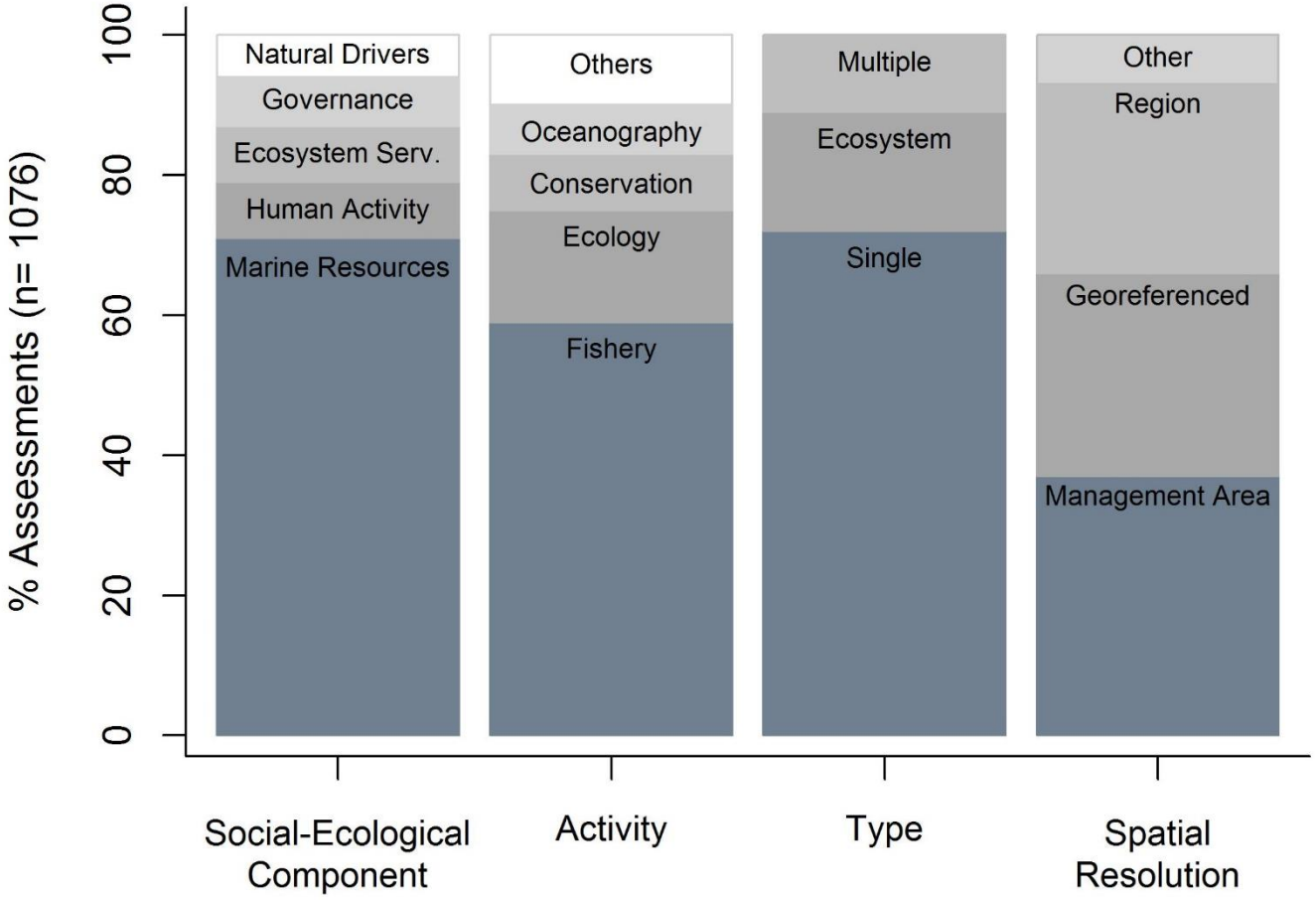
Current findings: Research themes

- **Research directly related to resource use (72% fisheries) is most common;**
- **Single-species research is still a large component;**
- **The Pacific region has the highest proportion of non-fisheries records.**



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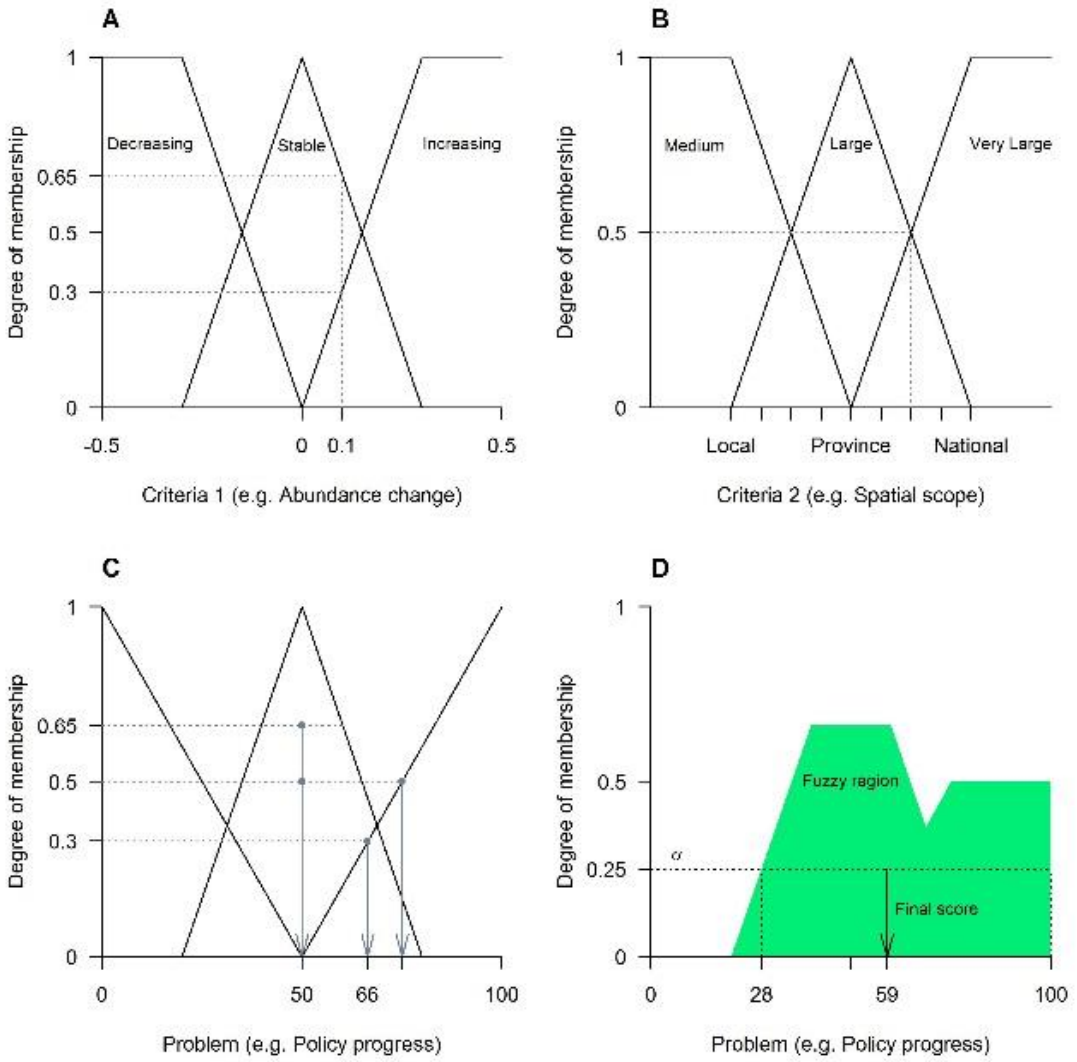
Evaluating biodiversity goals: fuzzy logic framework

- Heuristic categories evaluated for each indicator corresponding to a target;
- Resulting memberships combined into an overall score incorporating all indicators selected, regardless of their type.



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Current findings: Key species

- **Species with most metadata records in the Pacific are Pacific herring (11%), groundfish (10%) and bocaccio rockfish (likely due to overlap between fisheries and COSEWIC assessments; 7%);**
- **Overall, the top 1% of species with the most records account for 30% of all records.**

	Species
1	Pacific herring
2	Groundfish
3	Bocaccio rockfish
4	Coho salmon
5	Waterbirds
6	Shrimps
7	Chinook salmon
8	Sockeye salmon
9	Skates
10	Pacific sardine

Species
1 Arctic char
2 Beluga
3 Narwahl

Species
1 Snow crab
2 Atlantic cod
3 Atlantic herring

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