Use of Logic Models to Explore Fishery Issues

Atlantic Highly Migratory Species Advisory Panel Meeting

May 16, 2024

Outline

- Why are we talking about this?
  - Tool to facilitate discussion and understanding of fisheries issues at future AP meetings
- Description of the Facilitation Tool: Mental Modeler
- Example of a Logic Model

Why?

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2024 World Fisheries Congress

Shark Depredation Workshop

- Hosted and organized by Jonathan Mitchell (Queensland Government, AUS), Marcus Drymon (Mississippi State University), and Gary Jackson (Department of Primary Industries and Regional Development, AUS).
- Presentations by Marcus Drymon and Evan Prasky (University of Massachusetts Amherst)
- Small group work to identify concepts related to shark depredation
- Included academics and managers attending the conference

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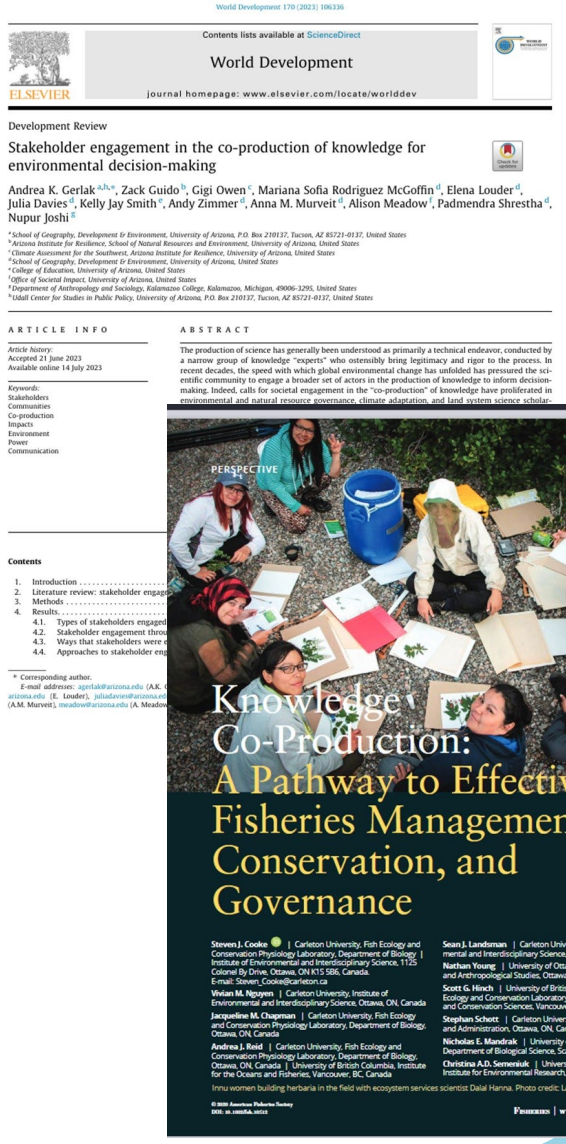
Shark Depredation Workshop: Mental Modeler Tool

- **Mental Modeler Tool** (https://www.mentalmodeler.com/)
- **Demonstrated value as an engagement tool to map out complicated situations or issues.**
- Used participatory concept mapping techniques called “Fuzzy-Logic Cognitive Mapping.”
- Based on the science and theories of knowledge co-production and stakeholder or rights holder (indigenous) engagement. (Gerlak et al. 2023)

Knowledge Co-Production

- “Collaboration among managers, scientists, and other stakeholders who, after identifying specific decisions to be informed by science, jointly define the scope and context of the problem, research questions, methods, and outputs, make scientific inferences, and develop strategies for the appropriate use of science.” (Beier et al. 2017)
- Other Examples – meetings, round tables, workshops, brainstorming tools, cooperative research, citizen science, strategic planning or prioritization exercises.



World Development 170 (2023) 106336

Contents lists available at ScienceDirect

World Development

journal homepage: www.elsevier.com/locate/worlddev

Development Review

Stakeholder engagement in the co-production of knowledge for environmental decision-making

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ARTICLE INFO

ABSTRACT

Contents

PERSPECTIVE

Knowledge Co-Production: A Pathway to Effective Fisheries Management, Conservation, and Governance

Beier et al. 2017 - https://conbio.onlinelibrary.wiley.com/doi/full/10.1111/conl.12300

Knowledge Co-Production

- We have used different engagement tools and knowledge co-production at past AP meetings to generate feedback, develop ideas, and to inform management priorities.

Knowledge Co-Production

- We are always looking for new approaches to collaborative work.

2016 Breakout Groups: Bluefin Management

- Pelagic Longline - Feedback on Amendment 7 measures, Potential Changes Before and During 3-Year Review
- Directed BFT Discussion – category retention limits, trophy fishery

The Mental Modeler Tool

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Shark Depredation Workshop

- World Fisheries Congress attendees were invited to join the workshop through the online agenda – organizers didn't know in advance who would show up.
- Participants were given a high level overview of the Mental Modeler tool and general instructions.
- Split into smaller work groups – represented sectors or regions (e.g., South Atlantic researchers, Australian researchers, managers).
- Each small group developed their own model.

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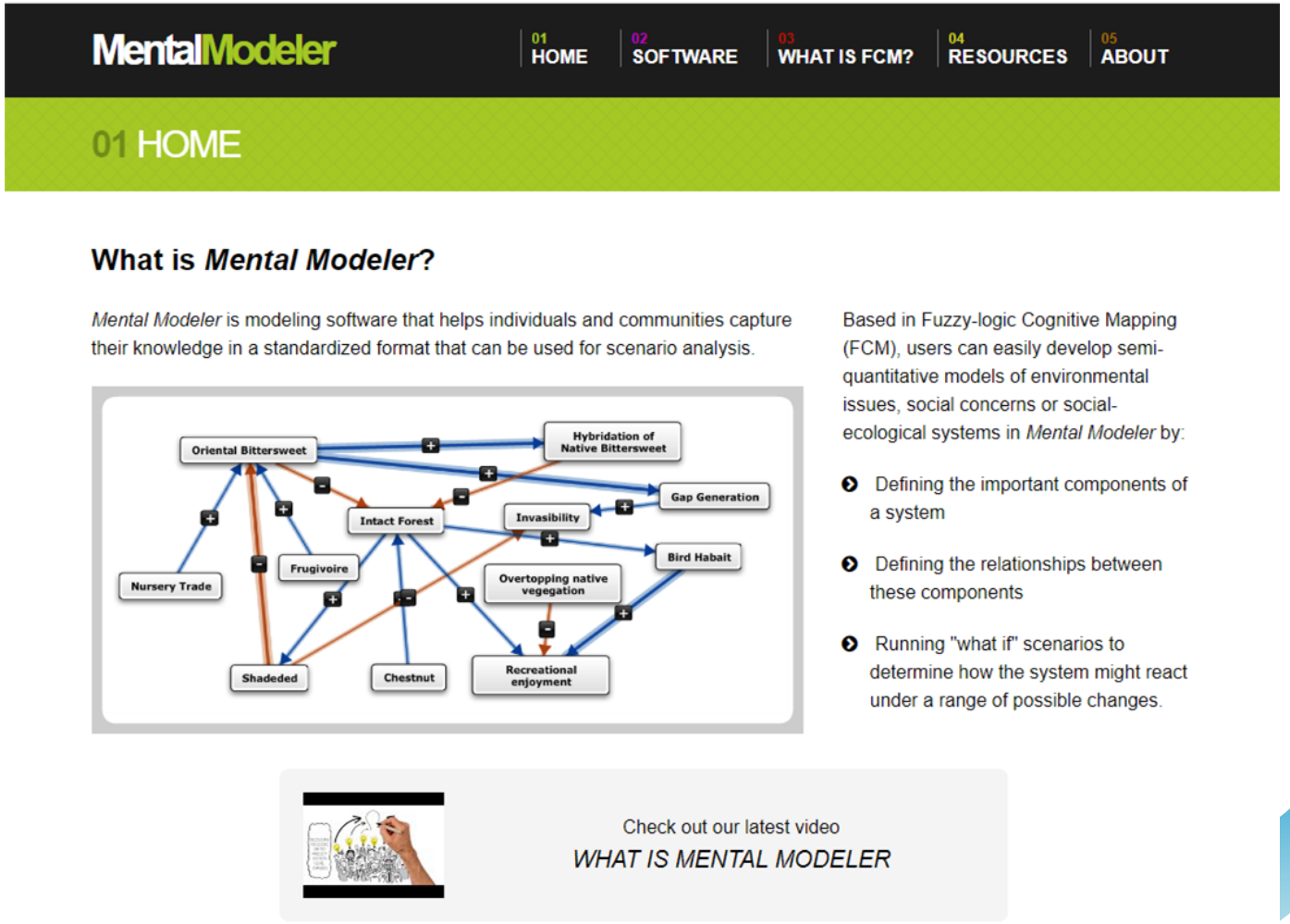
Mental Modeler

- Modeling software and online tool that helps identify and map knowledge.
- Intended for live, real-time exercises with small groups.

https://www.mentalmodeler.com/

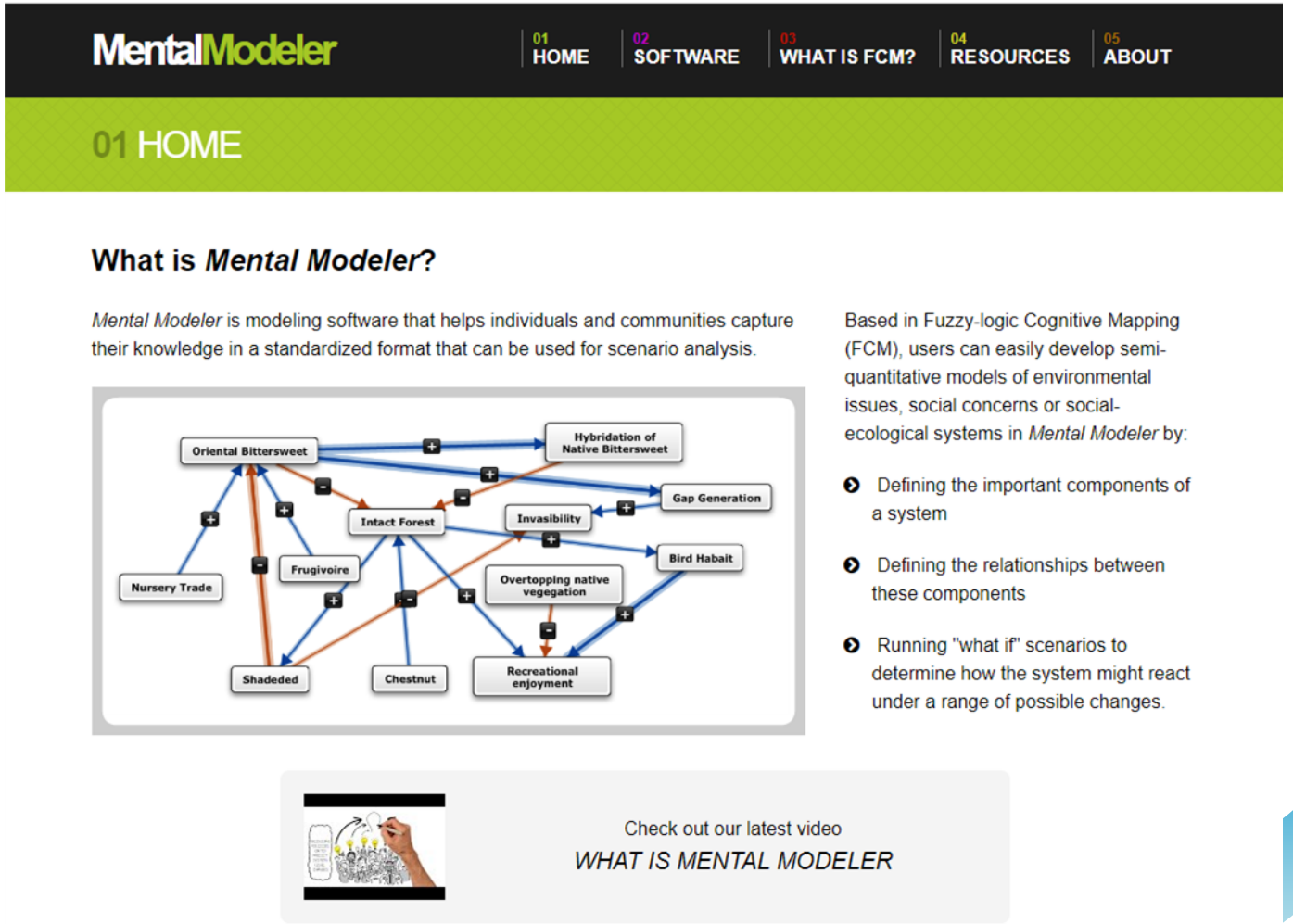


Mental Modeler

- Define important components of a system.
- Define and characterize relationships between components.
- Develop hypotheses.
- On-the-fly refining and testing of scenarios – what happens if you make system changes?

MentalModeler

https://www.mentalmodeler.com/



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Mental Modeler Tool

This tool might be a good option for some topics:

- Needs to be a specific, definable issue.
- Needs to be of interest to the entire AP – a topic only affecting or of interest to certain sectors might not be the best use of the full group's attention and time.
- Could be useful for scoping and brainstorming, i.e., early in the process of considering a management problem.
- If we need to capture diverse perspectives on the question - "Why is this happening?"

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Mental Modeler Tool

Benefits:

- Examine diverse perceptions and perspectives.
- Gives more information - high uncertainty and little empirical data.
- Biggest benefit: community learning (Gray et al. 2012)
- Diverse participants group (AP) = better model (Aminpour et al. 2021)

Challenges:

- Requires a lot of time (1/2 day to multi-day)
- Learning curve – the tool is complicated and it takes time to understand the process and do the exercise.
- Simplified representation of complex processes or situations.
- Facilitation - Loud or quiet voices? Pressure? Pace? Hybrid meeting?

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Some Examples

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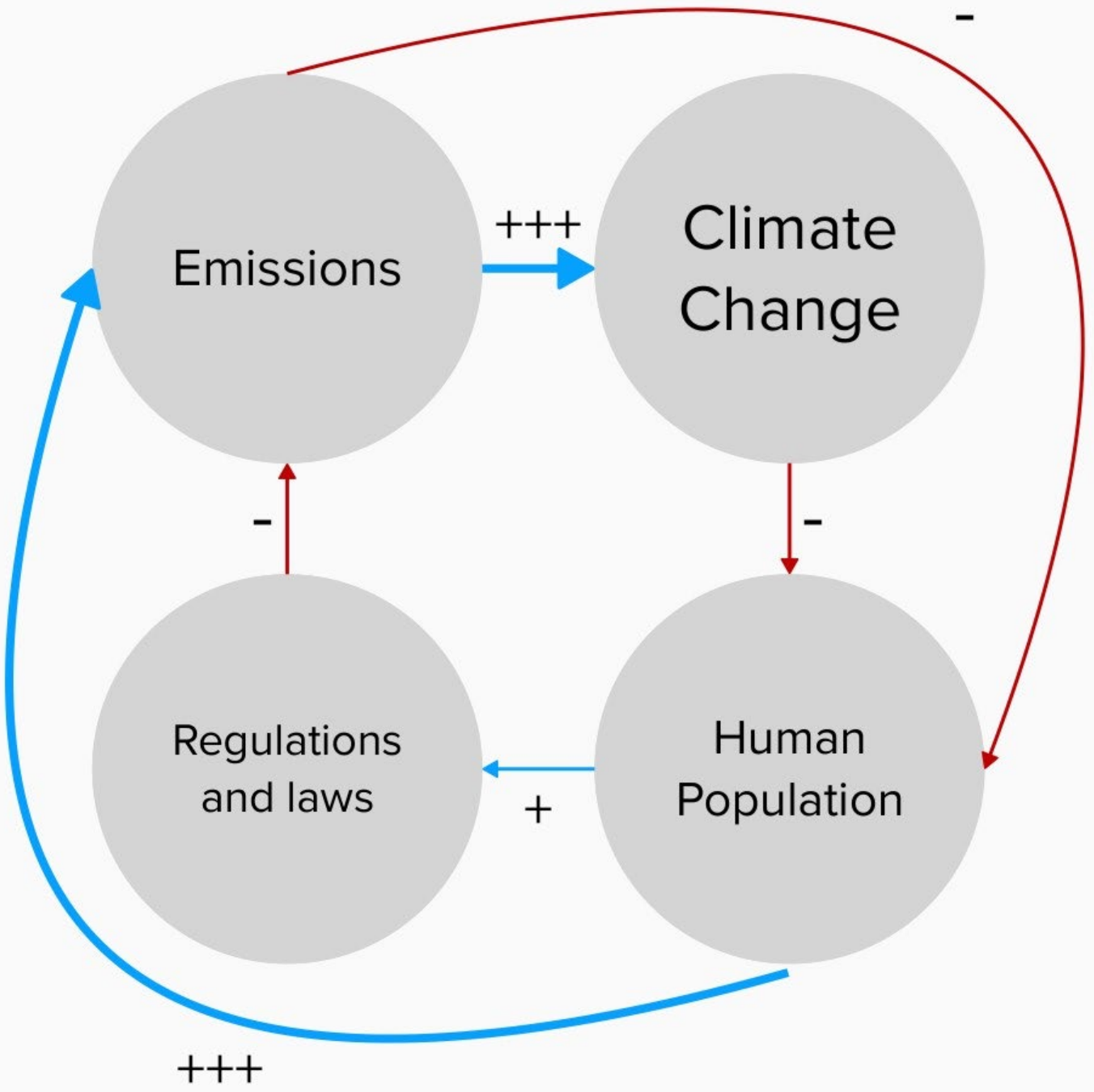
Example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Climate Change
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Regulations and laws
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Human Population
+++

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Shark Depredation Workshop

- General prompt to think about what may be causing, influencing, or impact of shark depredation.
- We started with the central topic (shark depredation) and thought about inputs (what affects it?) and outputs (what does it affect?).
- We assigned positive (+), negative (-), or uncertain (?) associations.
- We could also weight relationships – stronger relationships represented by a thicker line.

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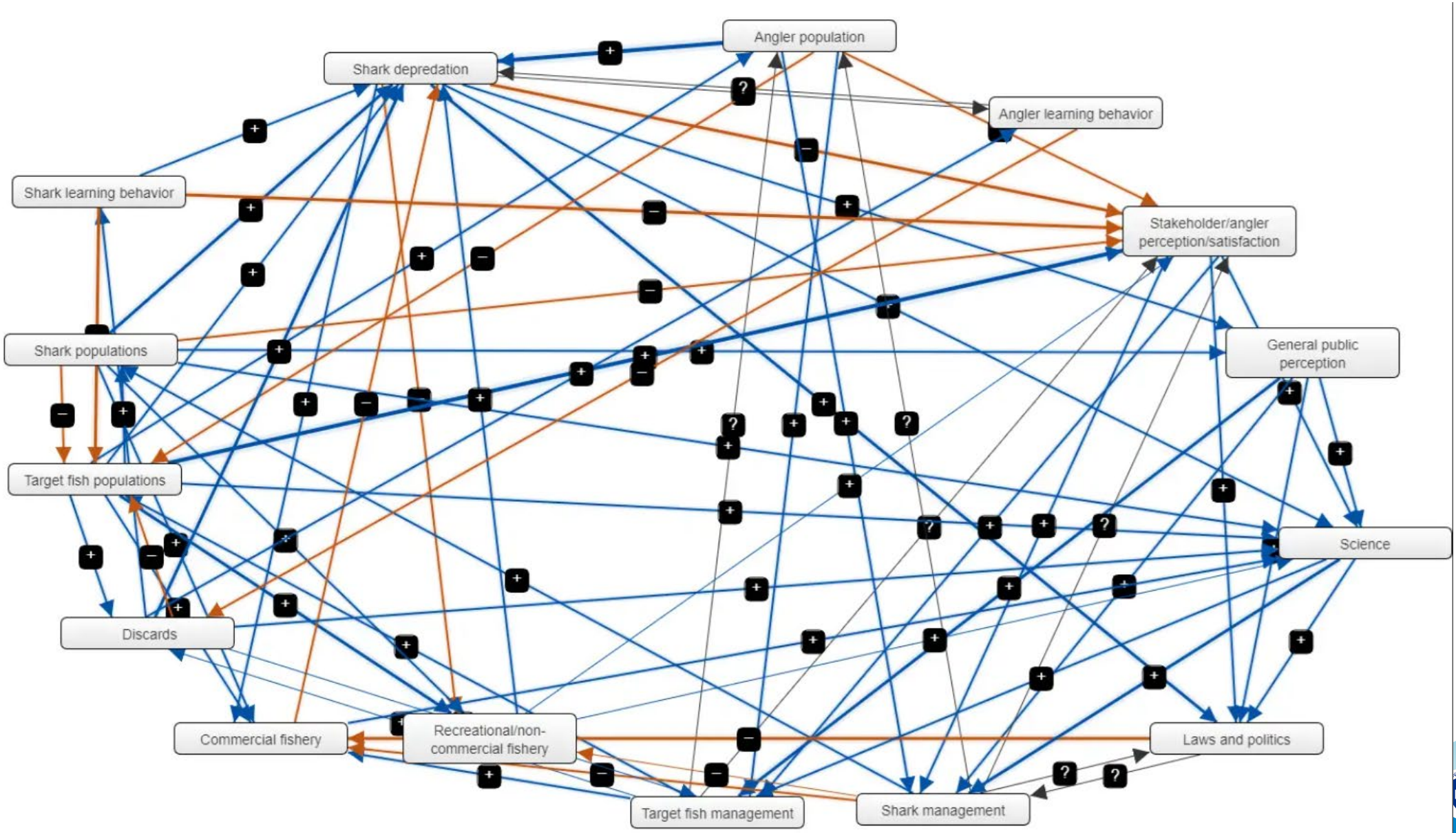
Shark Depredation Model – World Fisheries Congress



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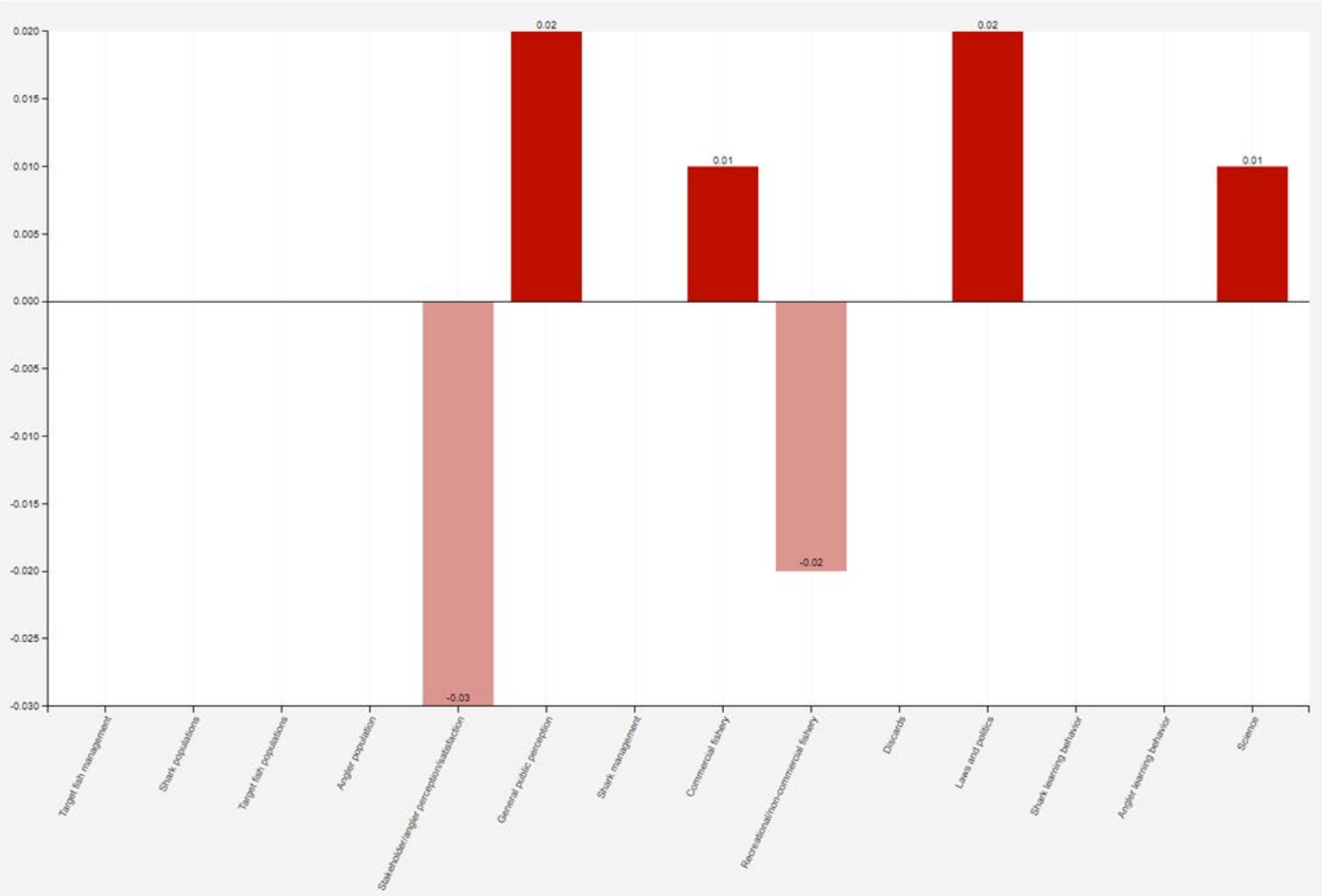
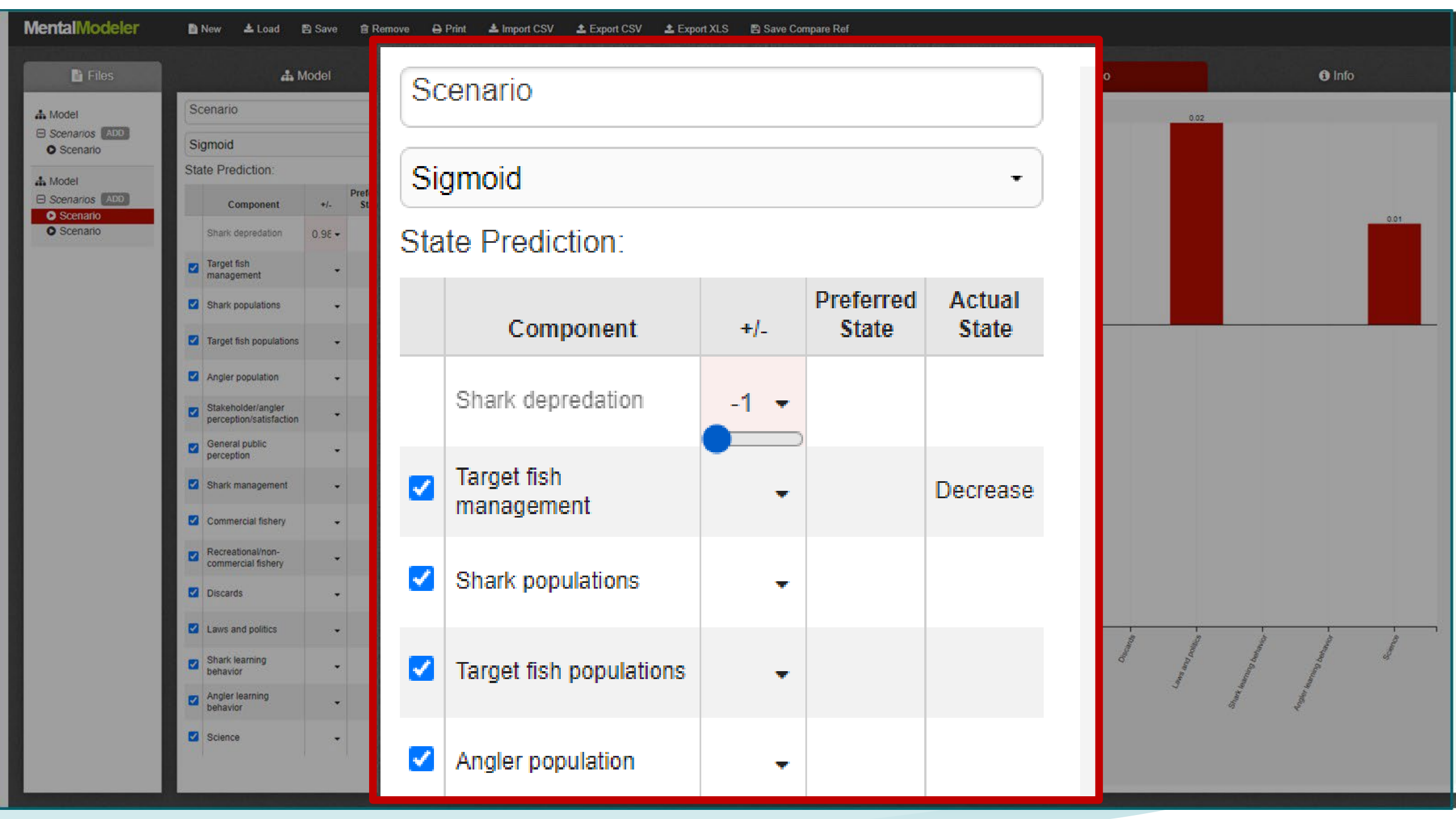
Scenario

Sigmoid

State Prediction:

	Component	+/-	Preferred State	Actual State
	Shark depredation	0.98		
☑	Target fish management			
☑	Shark populations			
☑	Target fish populations			
☑	Angler population			
☑	Stakeholder/angler perception/satisfaction			Decrease
☑	General public perception			Increase
☑	Shark management			
☑	Commercial fishery			Increase
☑	Recreational/non-commercial fishery			Decrease
☑	Discards			
☑	Laws and politics			Increase
☑	Shark learning behavior			
☑	Angler learning behavior			
☑	Science			Increase

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State Prediction:
Component
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Preferred State
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Shark depredation
-1
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Decrease
Shark populations
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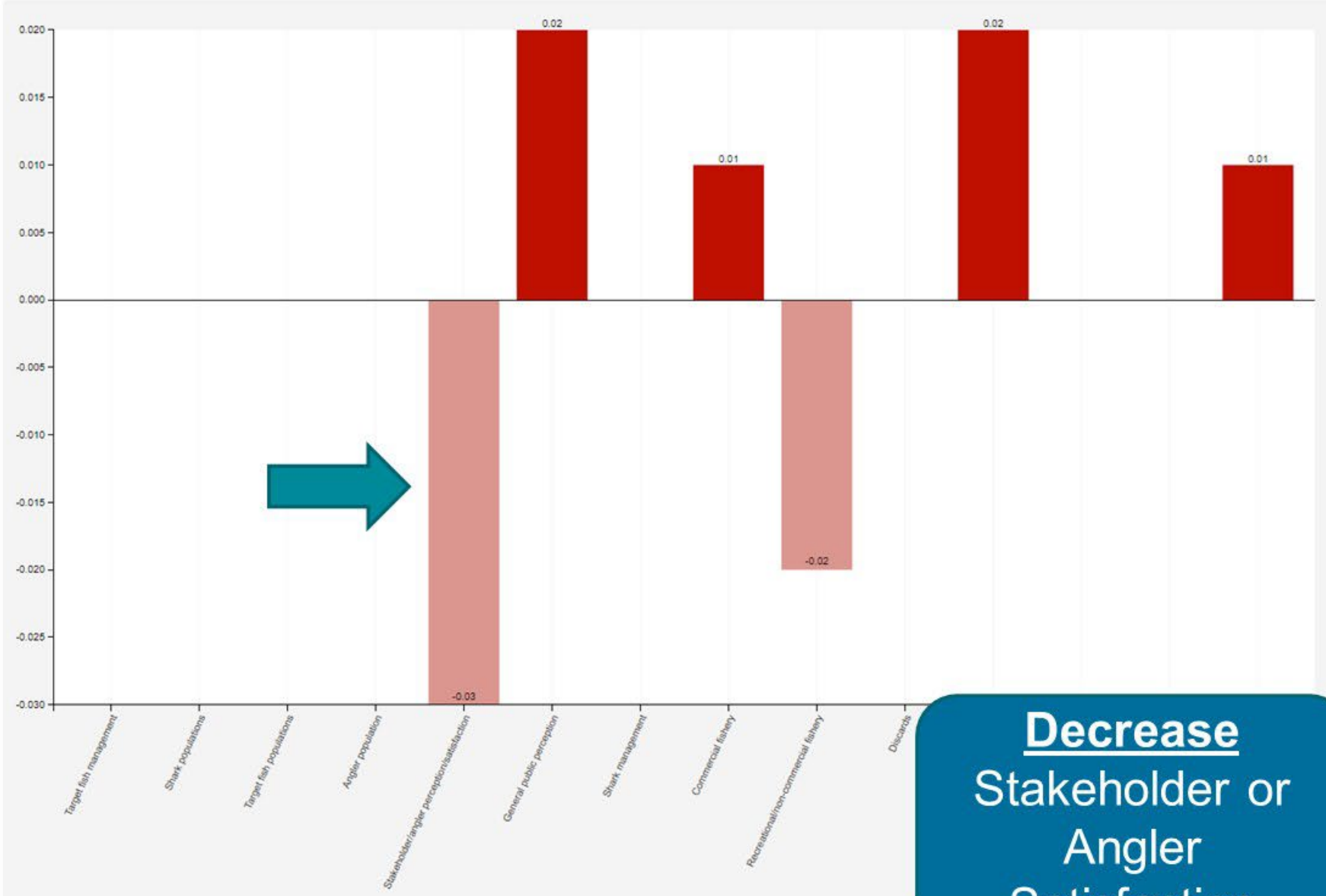

Increase Shark Depredation….

Decrease Stakeholder or Angler Satisfaction

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Sigmoid

State Prediction:

	Component	+/-	Preferred State	Actual State
	Shark depredation	-1		
☑	Target fish management			Decrease
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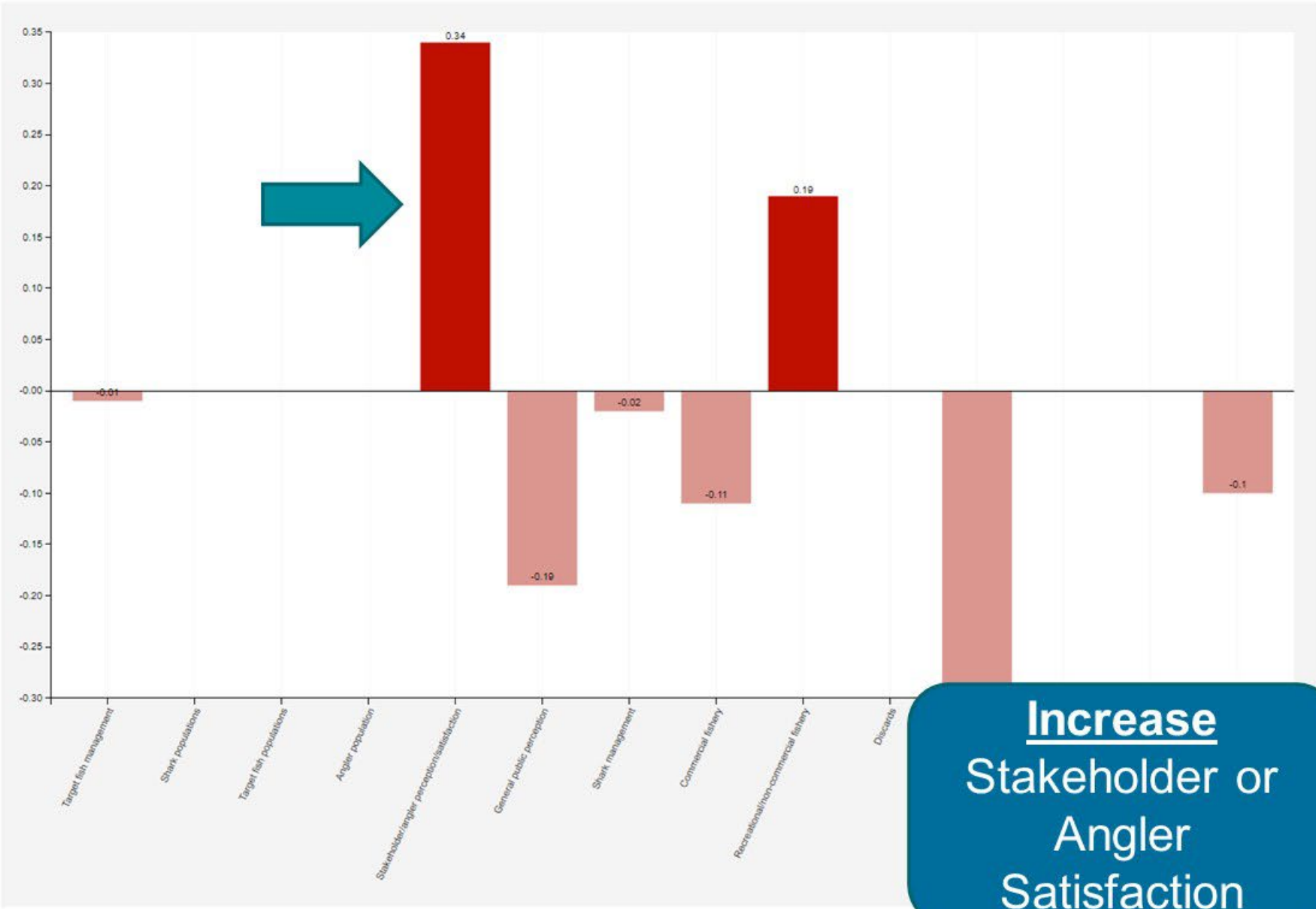

Decrease Shark Depredation….

Increase Stakeholder or Angler Satisfaction

Thank you for your attention!

Do you have any questions?

Do you have any suggestions on topics for future analysis with the Mental Modeler tool?

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