Is Multicriteria Decision Analysis for Ecosystem Services "Scalable"?

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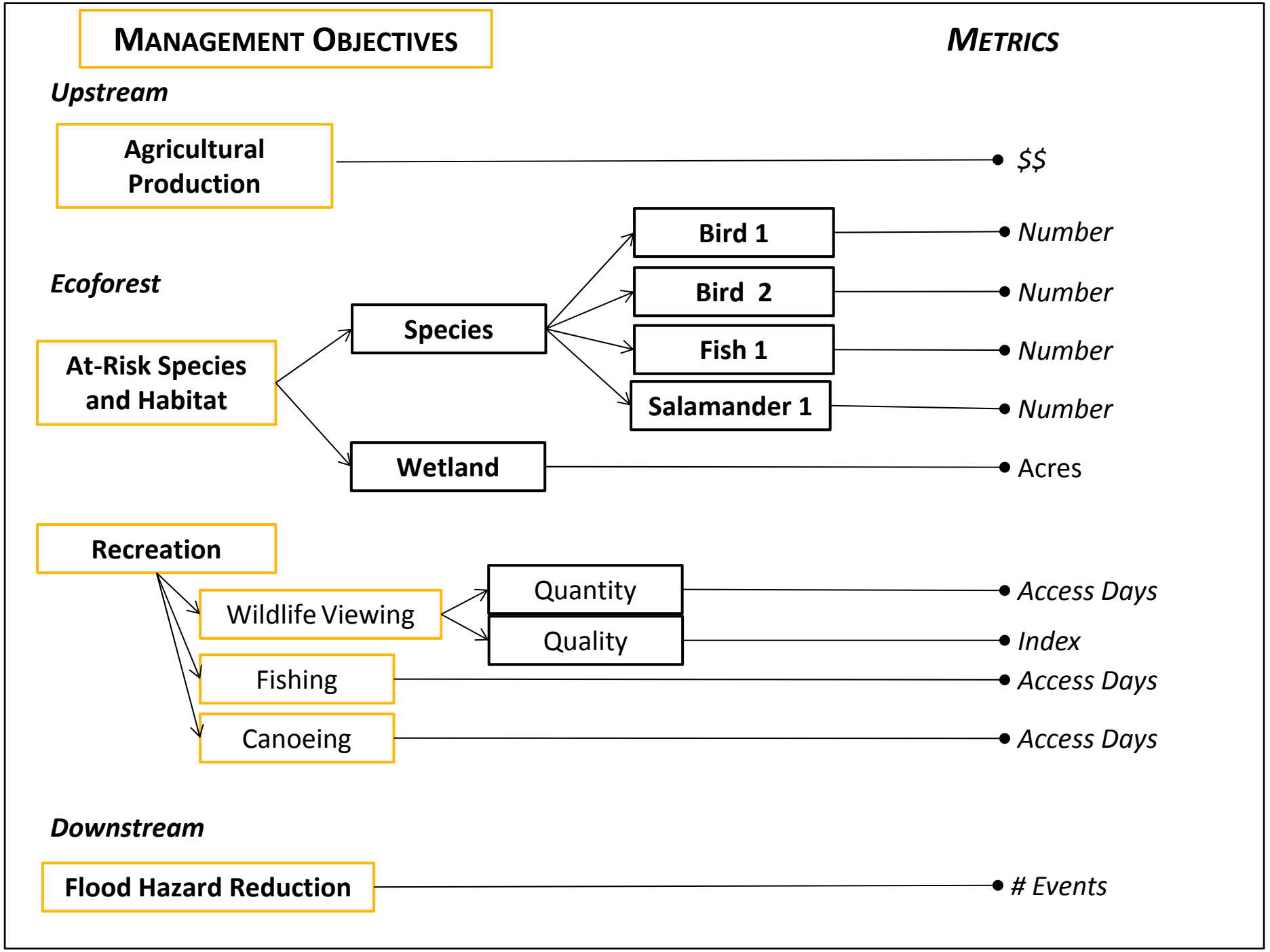
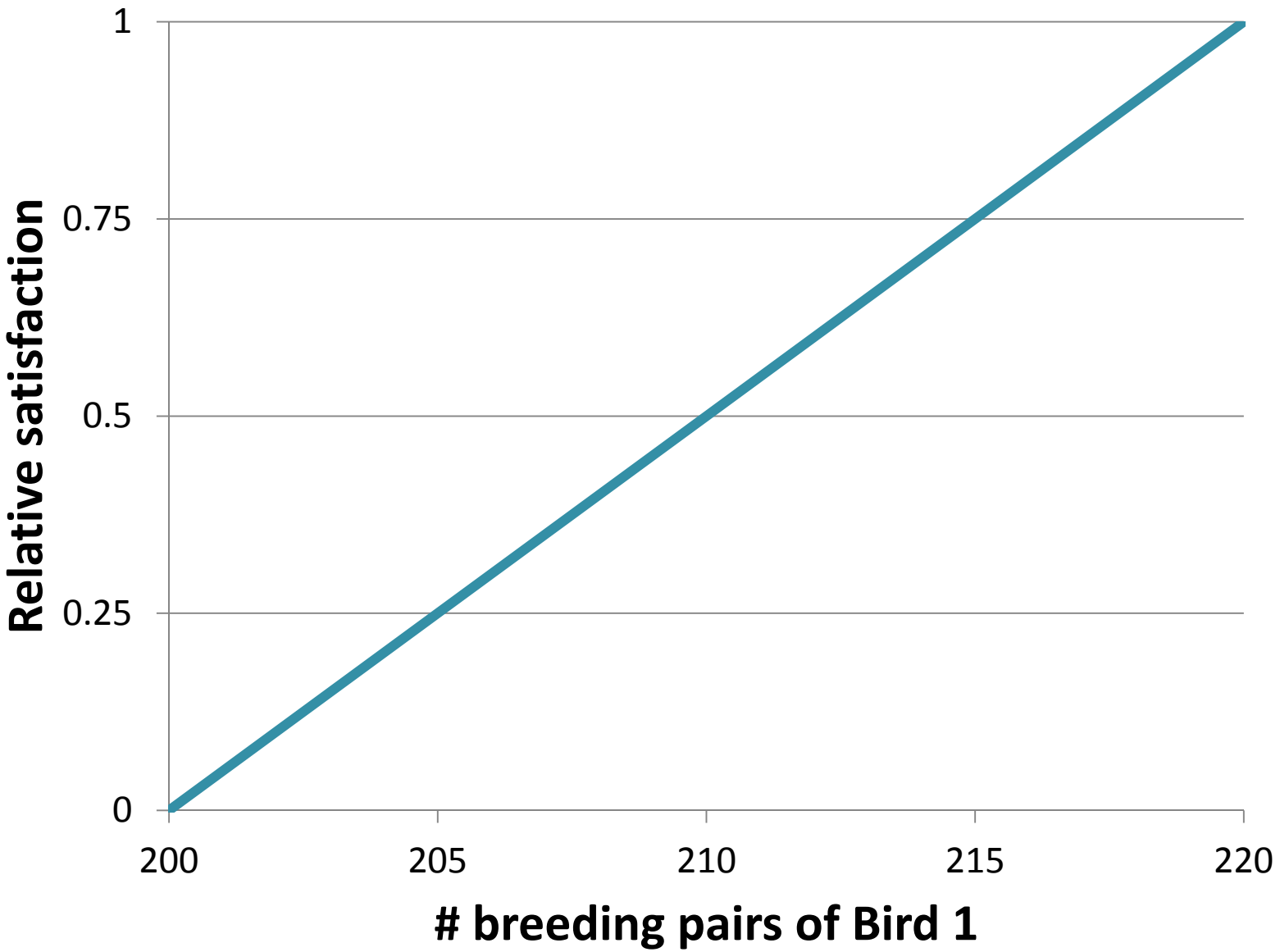
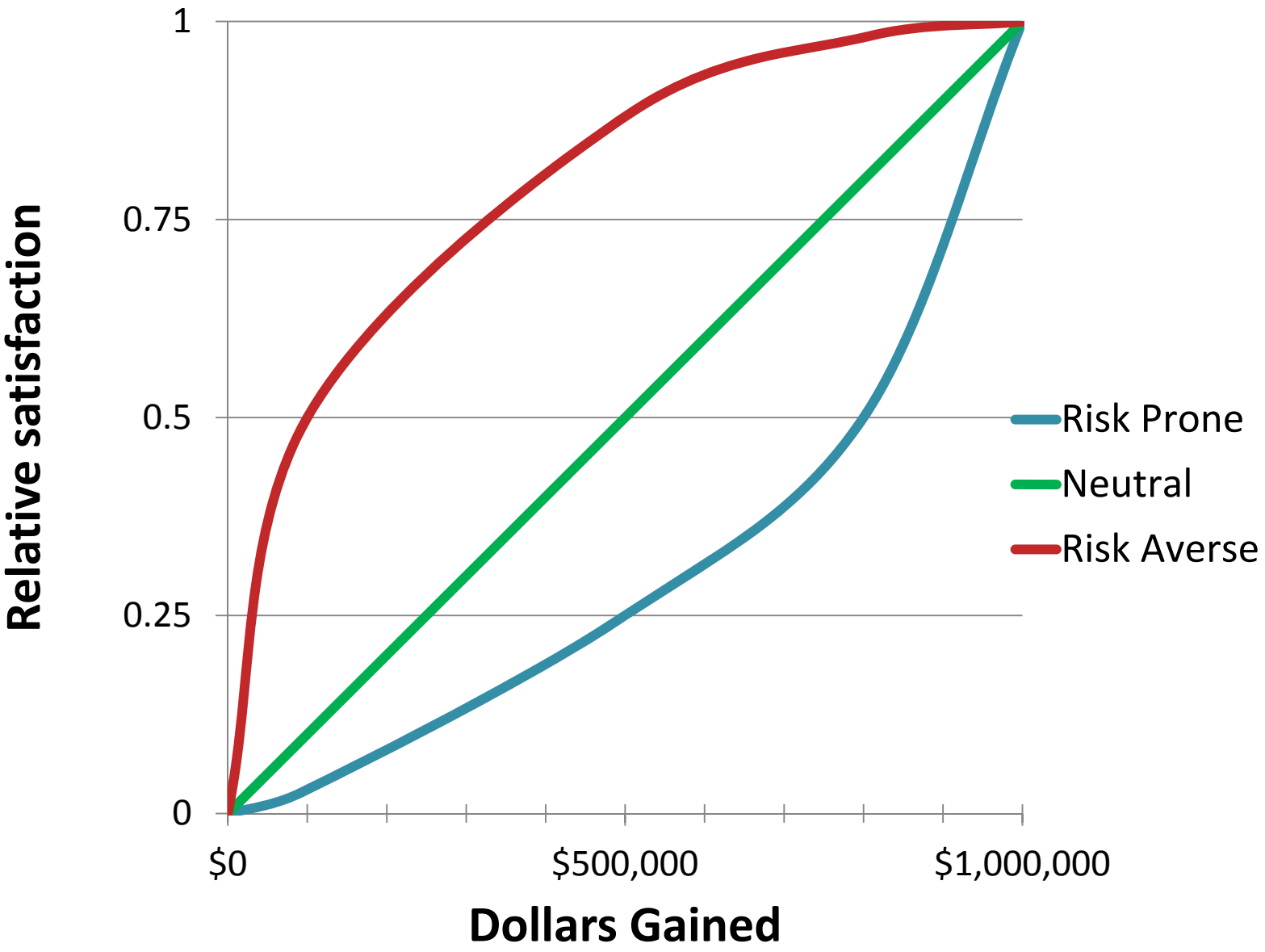
Duke University

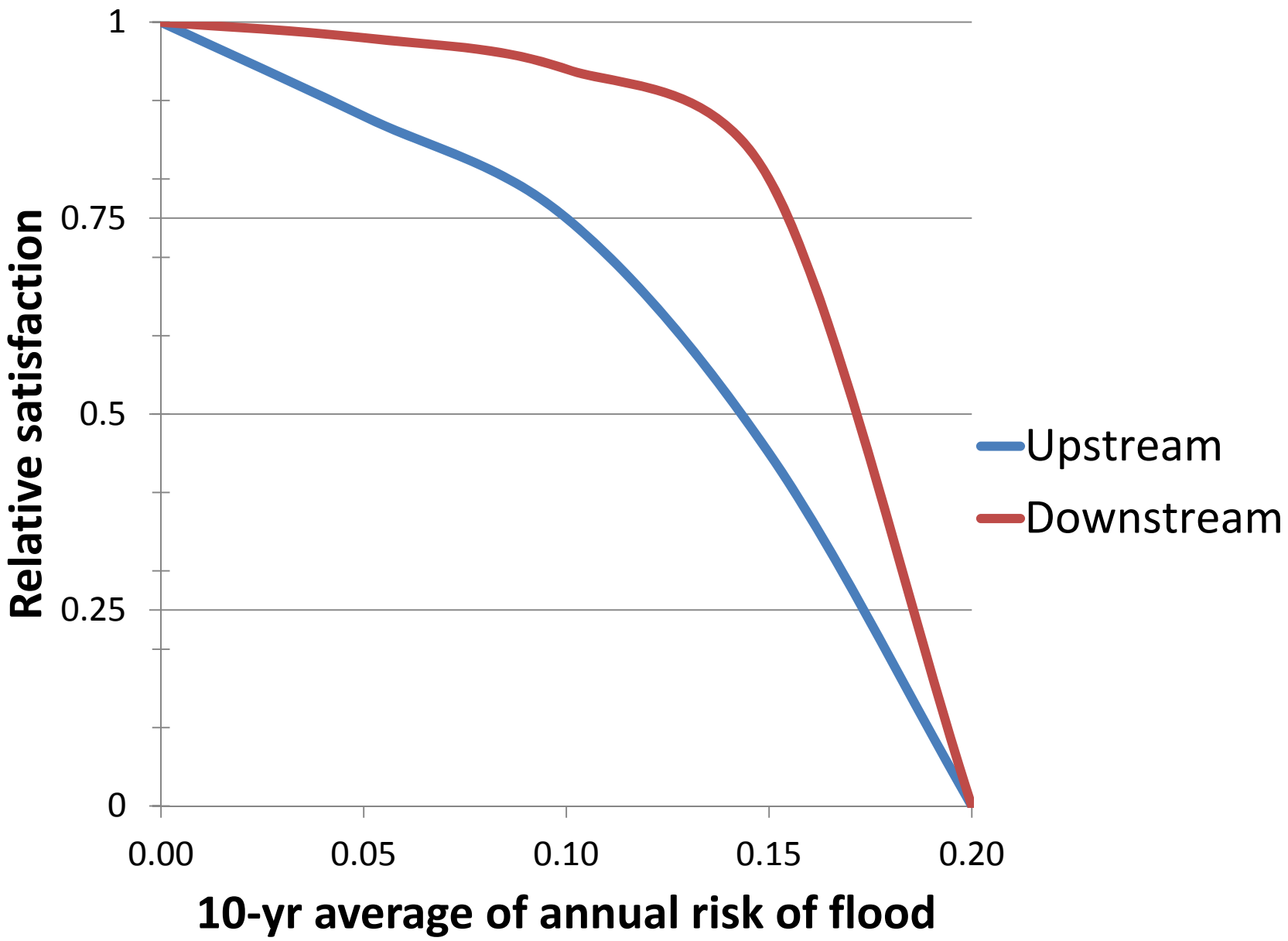

MANAGEMENT OBJECTIVES
METRICS
Upstream
Agricultural Production
$$
Ecoforest
At-Risk Species and Habitat
Species
Bird 1
Number
Bird 2
Number
Fish 1
Number
Salamander 1
Number
Wetland
Acres
Recreation
Wildlife Viewing
Quantity
Access Days
Quality
Index
Fishing
Access Days
Canoeing
Access Days
Downstream
Flood Hazard Reduction
Events

Performance of management alternatives

		Alternative actions	
Measures	**Status quo**	**Downstream dam**	**Upstream release**
Numbers of bird 1 (breeding pairs on forest)	200	220	205
Wildlife viewing at walkway site (qualitative scale)	One iconic sp < 5	One iconic sp < 5, one >5	Both >5
Flood events (annual average)	0.2	0.15	0.2
Cost ($MM NPV)	0.1	1.0	0.8

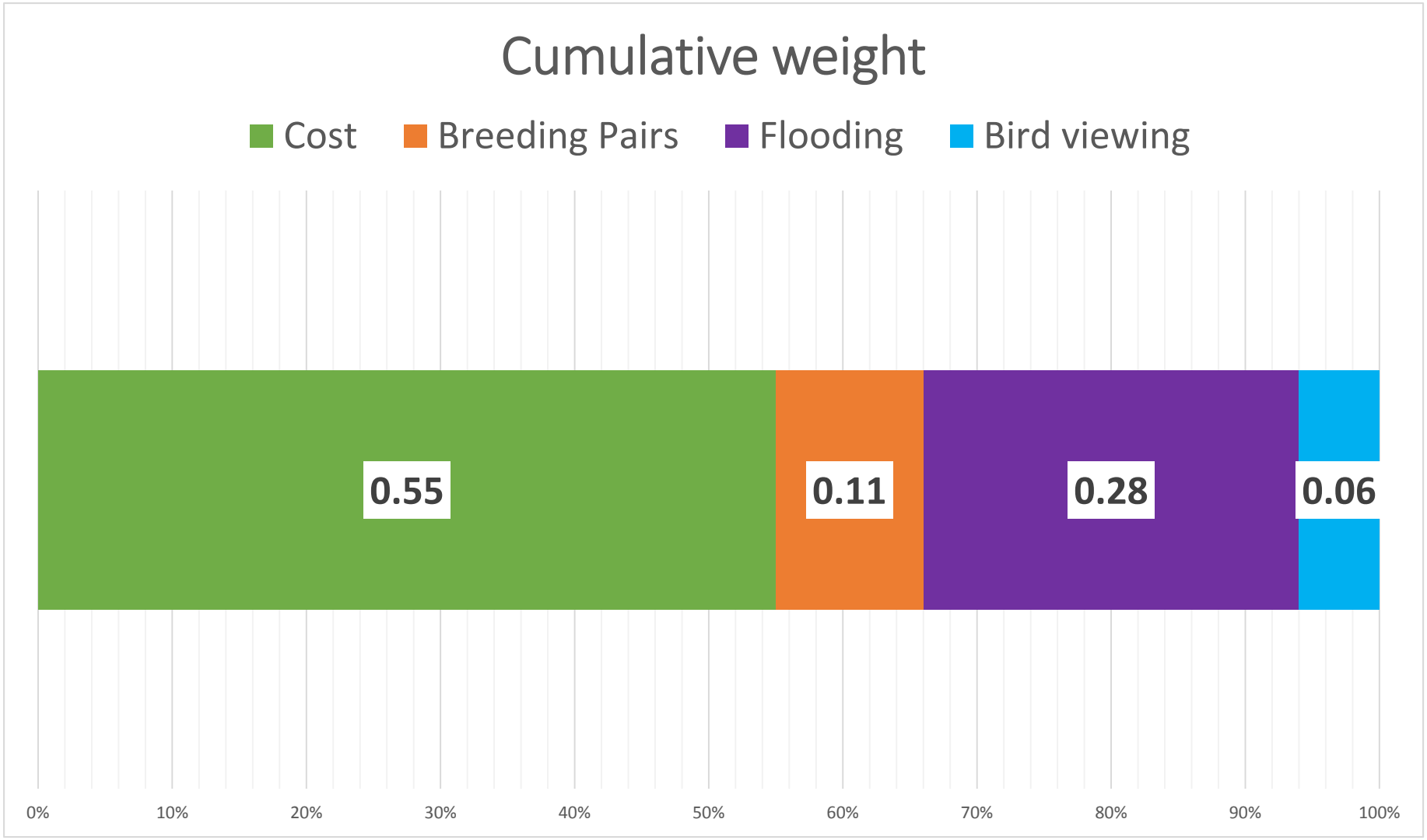

Relative satisfaction
1
0.75
0.5
0.25
0
200
205
210
215
220
breeding pairs of Bird 1


Relative satisfaction
1
0.75
0.5
0.25
0
$0
$500,000
$1,000,000
Dollars Gained
Risk Prone
Neutral
Risk Averse


1
0.75
0.5
0.25
0
Relative satisfaction
0.00
0.05
0.10
0.15
0.20
10-yr average of annual risk of flood
Upstream
Downstream

Performance and relative satisfaction

	Status quo	Downstream dam	Upstream release
Numbers of bird 1 (breeding pairs on forest)	200 ***(0)***	220 ***(1)***	205 ***(0.25)***
Wildlife viewing at walkway site (qualitative scale)	One iconic sp < 5 ***(0.14)***	One iconic sp < 5, one >5 ***(0.86)***	Both >5 ***(1)***
Flood events (annual average)	0.2 ***(0)***	0.15 ***(0.8)***	0.2 ***(0)***
Cost ($MM NPV)	0.1 ***(1)***	1.0 ***(0)***	0.8 ***(0.6)***


Cumulative weight
Cost
Breeding Pairs
Flooding
Bird viewing
0.55
0.11
0.28
0.06
0%
10%
20%
30%
40%
50%
60%
70%
80%
90%
100%

Weights and Overall Value

	Alternatives		
Measures *(Weights)*	Status quo	Downstream dam	Upstream release
Numbers of bird 1 (breeding pairs on forest) ***(w = 0.11)***	200 *(0)*	220 *(1)*	205 *(0.25)*
Wildlife viewing at walkway site (qualitative scale) ***(w = 0.06)***	One iconic sp < 5 *(0.14)*	One iconic sp < 5, one >5 *(0.86)*	Both >5 *(1)*
Flood events (annual average) ***(w = 0.28)***	0.2 *(0)*	0.15 *(0.8)*	0.2 *(0)*
Cost ($MM NPV) ***(w = 0.55)***	0.1 *(1)*	1.0 *(0)*	0.8 *(0.6)*
Overall value	***0.56***	***0.39***	***0.42***

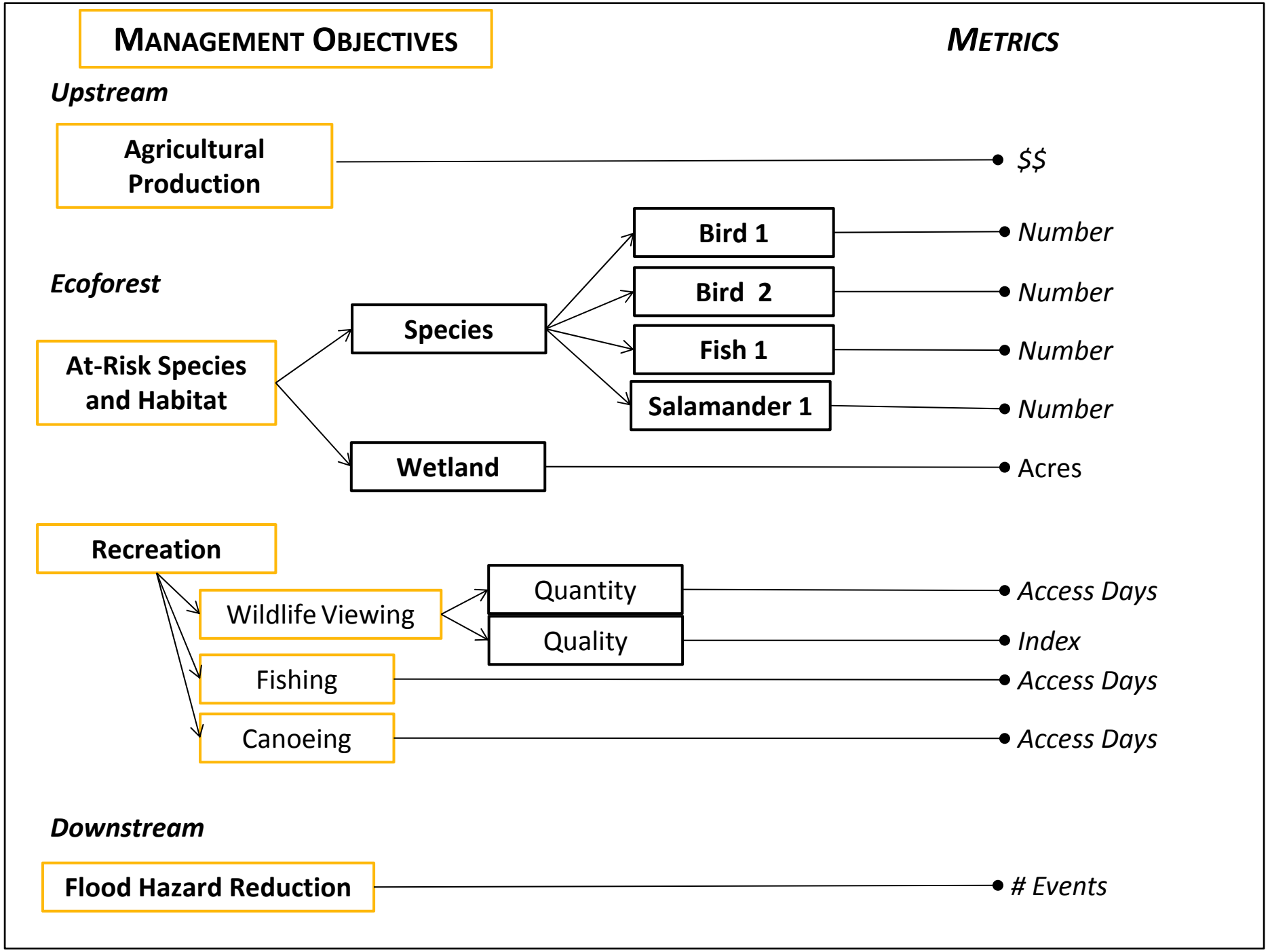
What is MCDA good for?

- Comparing/choosing (not accounting)
- Illuminating trade-offs
- Distinguishing “facts” from “values”
- Capturing expert opinion
- Using qualitative information
- Capturing sources of disagreement among disputing parties (often, differing preferences)

What does it mean to be “scalable”?

- Space
- Time
- Data availability
- Forms of stakeholder/citizen engagement
- Natural/social resource emphases
- Agencies

PREFERENCES ARE CONTEXT-DEPENDENT!!!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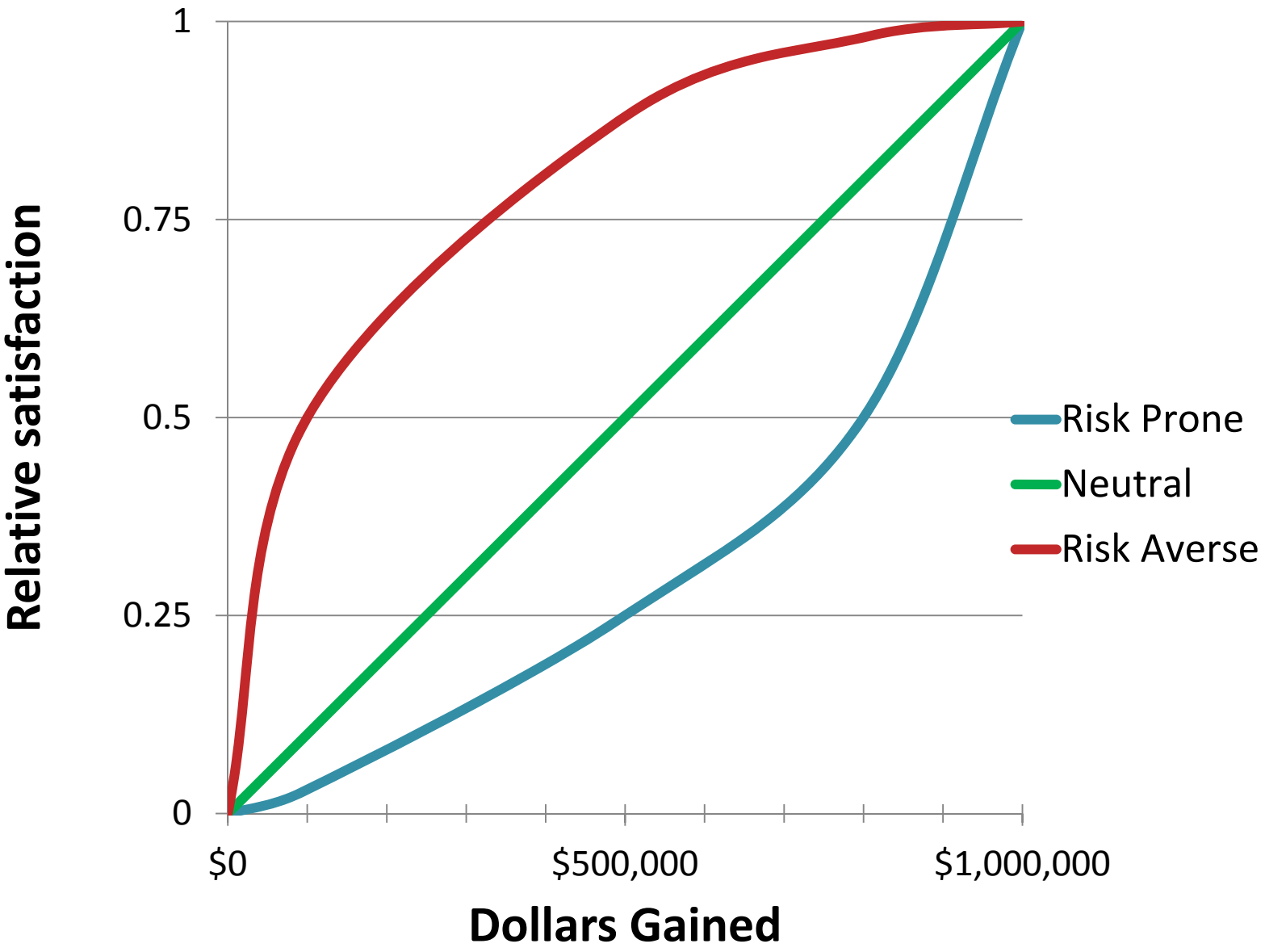
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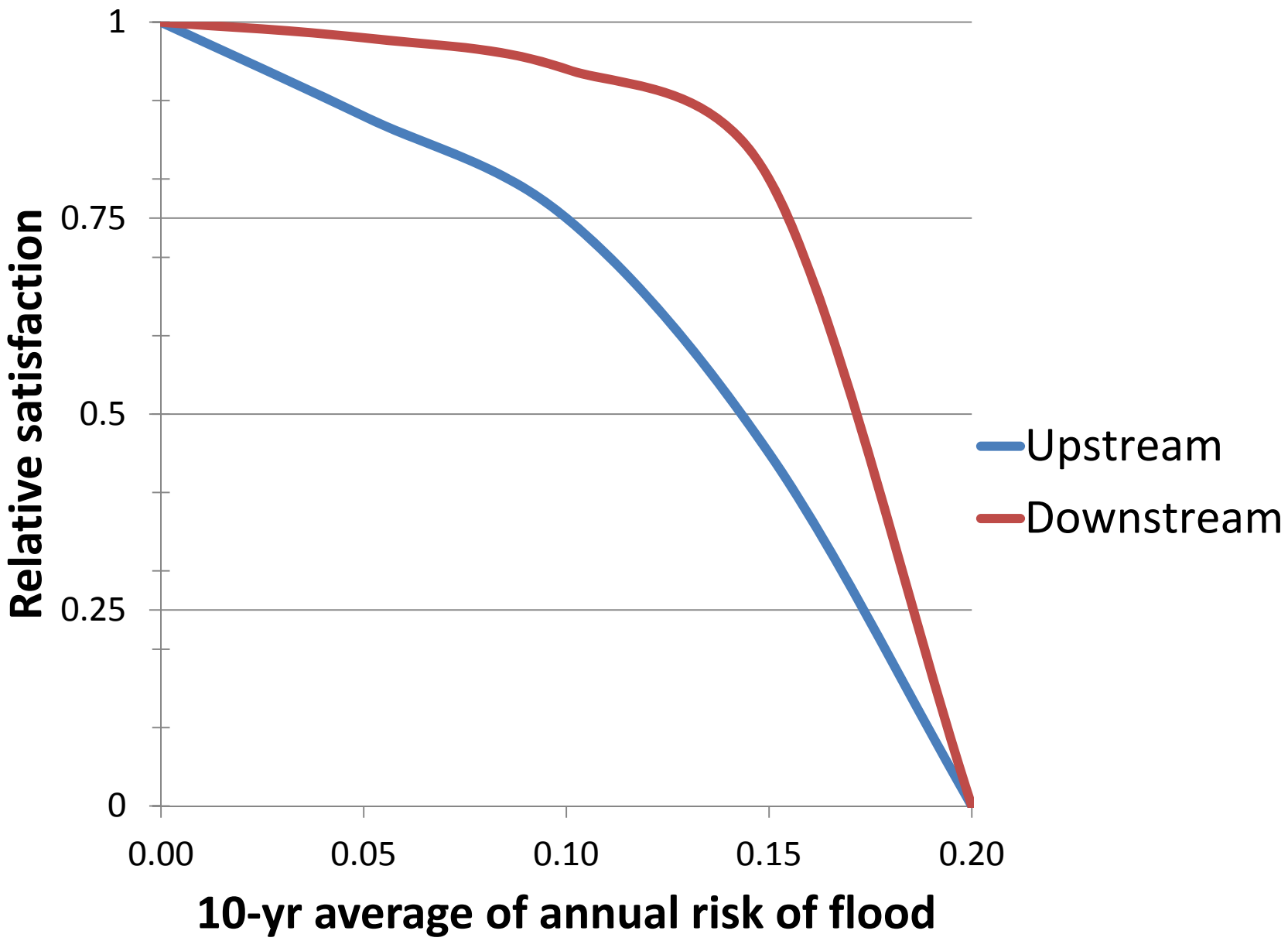
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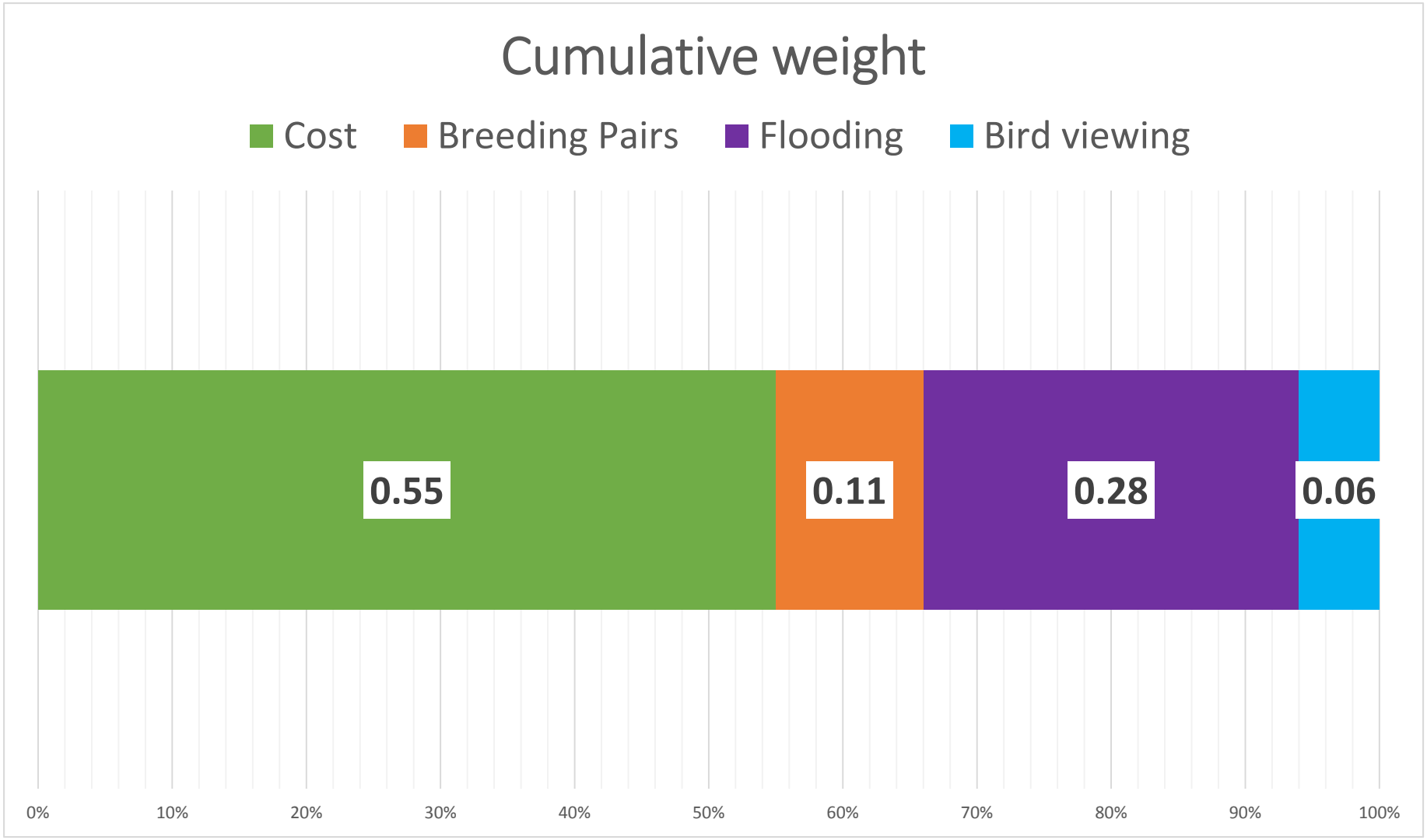
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The hard nuts to crack
(and, why do we want to crack them?)

- Transferring preference information across decision contexts

- Aggregating preference information