

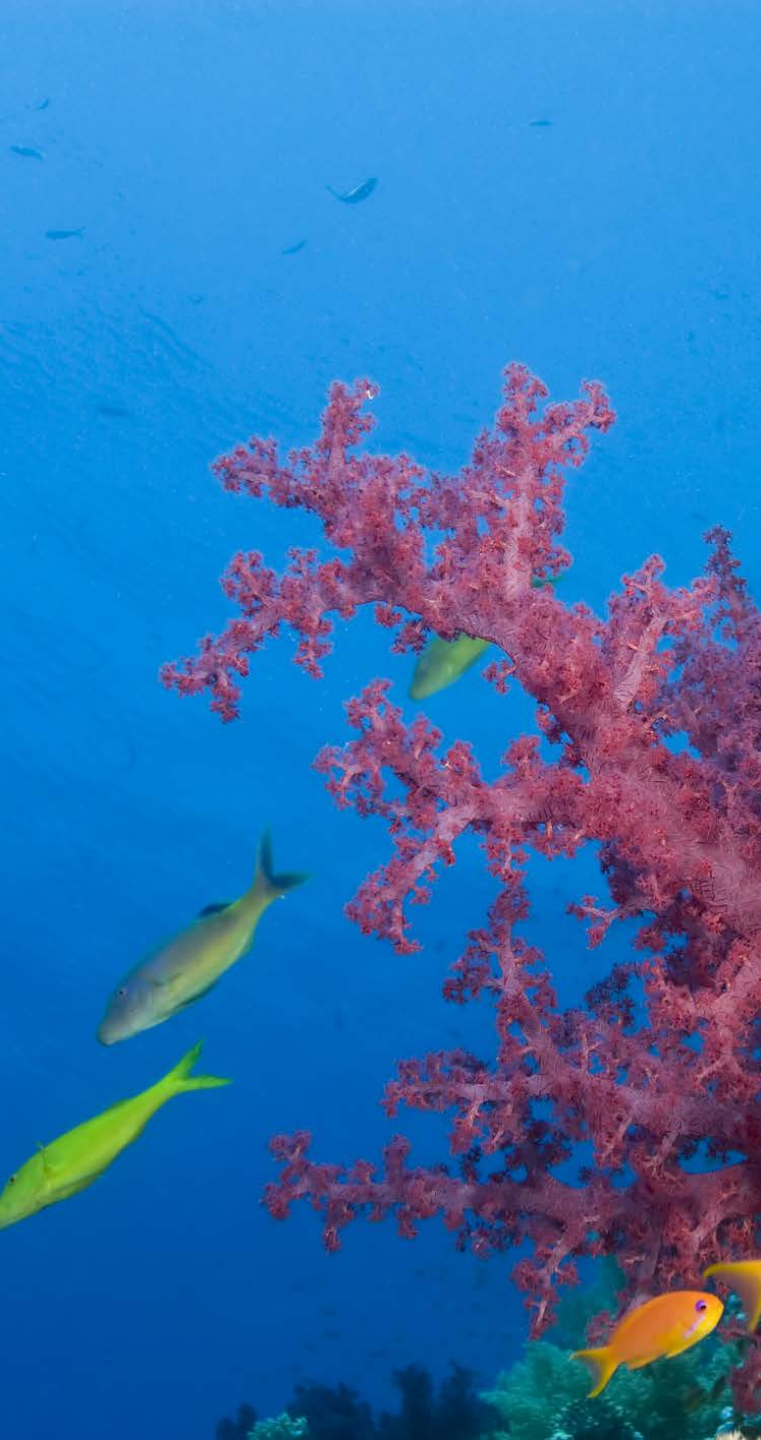
Coral Reef Alternatives Analysis: MCDA



HARVARD T.H. CHAN
SCHOOL OF PUBLIC HEALTH

C-CHANGE
CENTER FOR CLIMATE, HEALTH,
AND THE GLOBAL ENVIRONMENT





Katherine von Stackelberg
kvon@hsph.harvard.edu



@HarvardCCHANGE



@HarvardCCHANGE



/HarvardCCHANGE



HARVARD T.H. CHAN
SCHOOL OF PUBLIC HEALTH

C-CHANGE

CENTER FOR CLIMATE, HEALTH,
AND THE GLOBAL ENVIRONMENT



Specify Alternatives and Criteria

Intervention 1.dcm :: DECERNS - MCDA :: License for K. von Stackelberg/Harvard MS

File Samples Help

MAVT

Properties :Herbivore biomass

Criterion properties

Herbivore biomass

Name: Herbivore biomass

Description:

Scale: local \ - \ maximize \ vf: linear

Weight: -

Alternatives performances and scores

Alternative	Current	Score
Managed Selection	-	-
Managed Breeding	-	-
Larval Capture	-	-
Antioxidants	-	-
Nutritional	-	-
Assisted Gene Flow	-	-
Assisted Migration	-	-
Shading	-	-
Cool Water	-	-
Seagrass Meadows	-	-



Relationship between Criterion and Weighting

Intervention 1.dcm* :: DECERNS - MCDA :: License for K. von Stackelberg/Harvard MS

File Samples Help

Properties:Risk

Criterion properties

Name	Risk
Description	
Scale	local \ - \ maximize \ vf: linear
Weight	Error

Children weights

Criteria	Weight
subrisk	-
subrisk2	

Coral Reef Interventions Sw

- Risk S
- Cost V

Managed Selection

Managed Breeding

Larval Capture

Antioxidants

Nutritional

Assisted Gene Flow

Assisted Migration

Shading

Cool Water

Seagrass Meadows



Performance Table and Normalizing Scale

Intervention T_dcm :: DECERNS - MCDA :: License for K. von Stackelberg/Harvard MS

File Samples Help

MAVT

Criteria	Coral diversity	Herbivore biomass	Coral disease	Macroalgae cover	Recruitment	Resistant coral species
Name	Coral diversity	Herbivore biomass	Coral disease	Macroalgae cover	Recruitment	Resistant coral species
Description						
Scale	local \ - \ maximize \ ...	local \ - \ maximize \ vf: l...	local \ - \ maximize \ vf: li...	local \ - \ maximize \ vf: l...	local \ - \ maximize \ vf: li...	local \ - \ maximize \ vf: l...
Weight						

Performance Table

Alternatives / Criteria	Coral diversity	Herbivore biomass	Coral disease	Macroalgae cover	Recruitment	Resistant coral species
Managed Selection	-	-	-	-	-	-
Managed Breeding	-	-	-	-	-	-
Larval Capture	-	-	-	-	-	-
Antioxidants	-	-	-	-	-	-
Nutritional	-	-	-	-	-	-
Assisted Gene Flow	-	-	-	-	-	-
Assisted Migration	-	-	-	-	-	-

Scale properties : Scale - Coral ...

Scale properties

Property	Value
Units	-
Local/Global	Local
Min value	-
Max value	-
Min/Max	Maximize



Example of a Performance Table

Lead & PCB H2

MAVT

	C1 (Blood lead)	C2 (Cancer)	C3 (Child HI)	C4 (Eco Risk)
Name	C1 (Blood lead)	C2 (Cancer)	C3 (Child HI)	C4 (Eco Risk)
Description				
Scale	local \ none \ minimize \ vf:exp	local \ none \ minimize \ vf:linear	local \ none \ minimize \ vf:linear	local \ none \ maximize \ vf:line
Weight	0.15	0.15	0.15	0.12

Performance Table

Alternatives / Criteria	C1 (Blood lead)	C2 (Cancer)	C3 (Child HI)	C4 (Eco Risk)
A0	18	200		
A1	5	173		
A2	18	60		
A3	10	40		
A4	9	10		

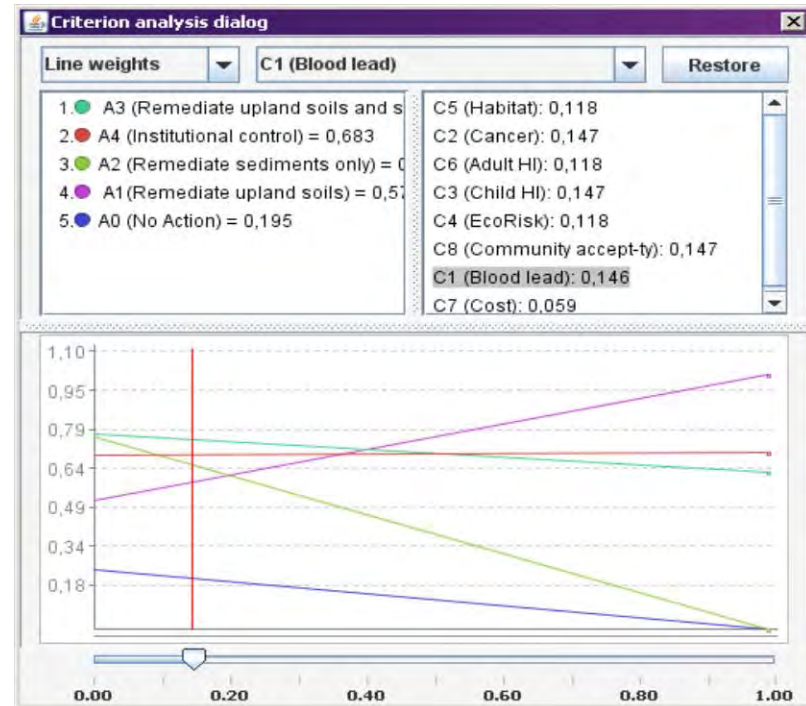
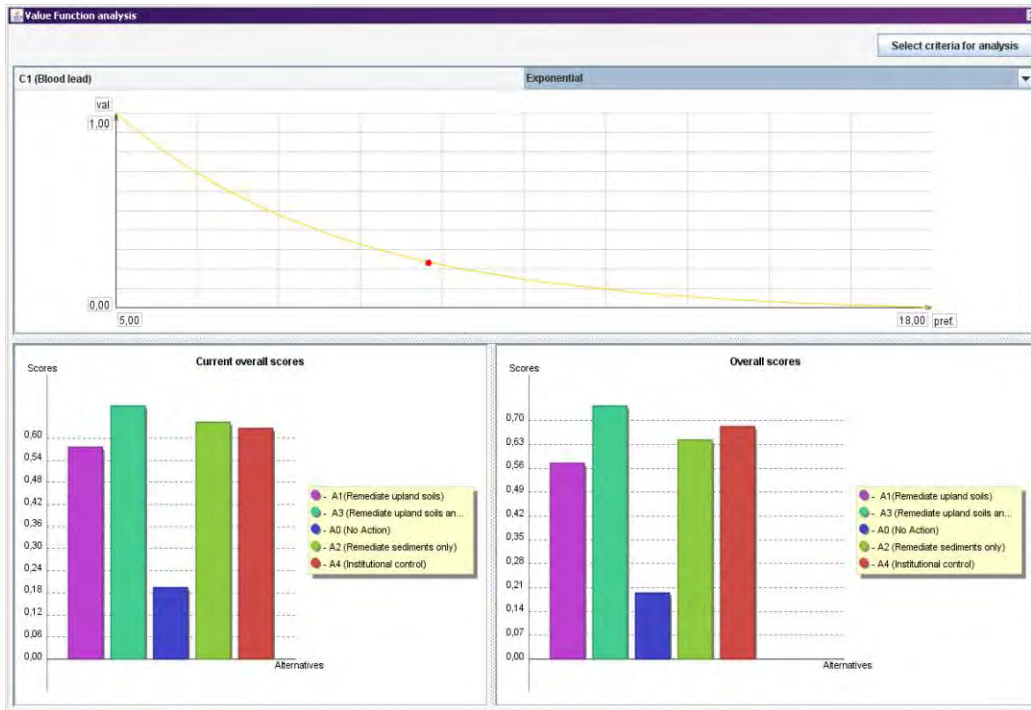
Map MCDA



Importance of Sensitivity Analysis

Value function

Weights





Many Possible MCDA Methods

Intervention 1.dcm :: DECERNS - MCDA :: License for K. von Stäckelberg/Harvard MS

File Samples Help

MAVT

Choose scenario

Scenario:

MAVT Add Edit

MAVT

Ok Cancel

Add new scenario

Scenario title:

MAVT

Method:

MAVT

MAVT
TOPSIS
AHP
PROMETHEE
MAUT
ProMAA
FuzzyMAVT
FMAA

Coral Reef Interventions Sw

Managed Selection
Managed Breeding
Coral Capture
Oxidants
Regional
Assisted Gene Flow
Assisted Migration
Loading
Pool Water
Seagrass Meadows

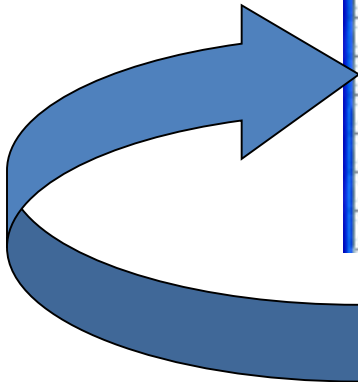


Weighting Criteria

Rating

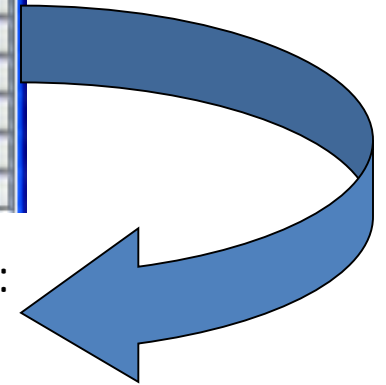
1. Assign 100 points to the most important attribute (Rank 1)
2. Give points (<100) to reflect the importance of the attribute relative to the most important attribute
3. Note: Weights are calculated using linear weighting scale

Criterion	Points	Weight
C1 (Blood lead)	100	0.150
C2 (Cancer)	100	0.150
C3 (Child HI)	100	0.150
C4 (Eco Risk)	80	0.120
C5 (Habitat)	80	0.120
C6 (Adult HI)	80	0.120
C7 (Cost)	40	0.060
C8 (Community Accepta...	100	0.150



- Blood lead in children
- Cancer risk
- Child hazard index
- Ecological risk
- Habitat suitability / quality
- Cost
- Community acceptance

- Methods:
- Swing
 - Direct
 - Ranking
 - Rating
 - Pairwise





Many Alternate Ways to Structure the Analysis

