Institute for Agricultural and Fisheries Research

FISHERIES MEASURES IN MPAs The Role of Science

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> MAIA international workshop A Coruña, Galicia, Spain 11 - 13 June 2012

> > "What men want is not knowledge, but certainty" - B. Russell

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Agriculture and Fisheries Policy Area

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Role of science

✓ Science reveals knowledge to answer

management questions...

	Science	Policy
Objective	Increase understanding	Immediate problems
Action	Empiricism, objectivity	Practical action, problem solving, legislation
Time frame	Long-term	Short-term
Decision basis	Scientific evidence	Legislation, science, public opinion, economic reality
Focus	Often single discipline based: Natural scientists – conservation Economists – cost benefit analysis Fisheries scientists – sustainable use	Pragmatism, balance of resource use and development, economic efficiency, sustainable development, multiple use, jobs

Putting science into practice

\checkmark The question is:

"how to put science into practice?"



has to be balanced by our need for concealment."



\checkmark The question is:

"how to put science into practice?"

1. Science: only one of the players

Putting science into practice



(c) Verweij *et al.* (2010)

Scientific credibility

- The snag in scientific advice: advocacy
- ✓Why?
 - Ignorance of advice
 - Interdependency with stakeholders
 - Scientist's own policy belief
- ✓ How to avoid advocacy science?
 - 1. Work interdisciplinary
 - 2. Have a rigorous scientific process
 - 3. Communicate uncertainty



✓ Interdisciplinary: many expertises put in context





✓ Interdisciplinary: many expertises put in context



Can/should sociologists be included?

Evaluation of the MPA in relation to (1) employment, (2) viability of coastal communities, (3) job attractiveness ,(4) individual fishermen affected...

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✓ Interdisciplinary: many expertises put in context



✓ Interdisciplinary: many expertises put in context





✓ Interdisciplinary: many expertises put in context



Scientists for legal aspects?

Have a rigorous scientific process



Have a rigorous scientific process



(c) ICES (2012a,b)



✓ Interdisciplinary: focus on ecosystem effects



✓ Fishing: ecosystem effects, methodology

SCOPING

Set by conservation objectives

SELECTION OF UNIT OF ANALYSIS

Characteristic spp for habitats?

SPEC. SENSITIVITY ASSESSMENT

					R	ecoverabili	ty		
			None	Very low (>25 yr.)	Low (>10–25 yr.)	Moderate (>5 -10 yr.)	High (1 - 5 yr.)	Very high (<1 yr.)	Immediat e (< 1 week)
		High				Moderate	Moderate	Low	Very low
	۶ د	Intermediate				Moderate	Low	Low	Very Low
2	a	Low		Moderate	Moderate	Low	Low	Very Low	
10	tole	Tolerant							
Ŀ		Tolerant*							
		Notrelevant	NR	NR	NR	NR	NR	NR	NR

SENSITIVITY MAPS

roadmap

RISK MAPS

Spatial/temporal distribution of fishing

✓ Fishing: ecosystem effects, methodology

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	High	Very high	Very high	High	Moderate	Moderate	Low	Very low		
8	Intermediate	Very high	High	High	Moderate	Low	Low	Very Low		
Iran	Low	High	Moderate	Moderate	Low	Low	Very Low	NS		
tole	Tolerant	NS	NS	NS	NS	NS	NS	NS		
2	Tolerant*	NS*	NS*	NS*	NS*	NS*	NS*	NS*		
	Notrelevant	NR	NR	NR	NR	NR	NR	NR		

SENSITIVITY MAPS

roadmap

RISK MAPS

Spatial/temporal distribution of fishing

uncertail

✓ Fishing: ecosystem effects, methodology

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Intolerance	ce	Intermediate	Very high	High	High	Moderate	Low	Low	Very Low	
	ran	Low	High	Moderate	Moderate	Low	Low	Very Low	NS	
	tole	Tolerant	NS	NS	NS	NS	NS	NS	NS	
	드	Tolerant*	NS*	NS*	NS*	NS*	NS*	NS*	NS*	
		Notrelevant	NR	NR	NR	NR	NR	NR	NR	

SENSITIVITY MAPS

roadmap

RISK MAPS

Spatial/temporal distribution of fishing

uncertainty

✓ Direct effects: best studied

	Beam Trawl Mortalities	Catch (amount and survival)	Tow path	Ghost	Weighed sum	
Ň	Factor	0.1	0.9	0.1*0.15		
T.	Asterias rubens	2	1	0	1.0	
5	Liocarcinus holsatus	3	2	0	2.1	
X	Ophiura ophiura	2	3	0	2.9	

✓ How to include indirect effects?

- Scavengers: mortality vs. increased food
- Detrivores: mortality vs. reduced competition
- VME indicators: indirectly influenced through ecosystem changes
- ✓ Fishing effort: non-linear effects?

Ecosystem approach, new science, more complex, more factors to evaluate!

- Ignore them? Over-/underselling complexity!?
- Building scientific consensus (expert judgement)
- Quantify uncertainty



✓ Pedigree index: measures strength of results



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(c) www.nusap.net



✓ Fishing: ecosystem effects, methodology



✓ Uncertainty in impact on individual species
 ✓ Uncertainty in occurrence of species
 ✓ Uncertainty in fishing effort occurrences
 (3 yrs <> 10 yrs)

Methods for communicating uncertainty exists
 BUT

✓ Where is the limit?

scientific and stakeholder consensus

Conclusions





Conclusions



- ✓ Science is only one of the players
- Beware of the snag in scientific advice
 - Work interdisciplinary (and integrate?)
 - Have a rigorous scientific process (but how?)
 - Communicate uncertainty (to what extent? how?)

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Thank you for your attention

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Questions

 Is integration of scientific disciplines needed?
 Should scientists deal with integration *a priori* or is it part of the management process? Do we need social science, next to economists?

 ✓ Is information on scientific uncertainty helpful? Should there be a general framework to communicate this? How to communicate this? What level of details is workable? Overselling vs underselling complexity...

\checkmark The question is:

"how to put science into practice?"

✓ Designation of MPAs in Belgium:

- 1999: birth of nomination
- 1999-2003: identical process
 Based on science and policy
- Early 2003: 'Vlakte van de Raan' in court by windmill farm:
 designation failed!



Designation of MPAs in Belgium

- Early 2003: 'Vlakte van de Raan' in court by windmill compagny: designation failed!
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