

# Towards Ecosystem Based Fisheries Management in the Baltic Sea

Adequate science is not the problem, but integration.  
How do we prepare to ask the right questions?

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# What is risk?

# Definition of Risk

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## **Risk Assessment**

- Threats and vulnerabilities
- Uncertainty of an impact
- Likelihood of an impact
- Magnitude of an impact
- Severity of an impact
- Consequences of an impact
- Danger or a hazard

## **Risk Management**

- Effect of uncertainty on objectives

Each one of the risk concerns are all  
part of the overall risk management  
context

## **Risk Assessment**

- Identify and describe the nature and level of existing and potential risks
- Monitor and report status and trends

## **Risk Management**

- Determine whether a risk and/or its magnitude is acceptable
- Implement a given course of action to reduce the uncertainty of achieving objectives
- Review and improve the performance of the management system

## Risk Assessment

- Why is it a risk?
  - Values and objectives
- What are the sources of risk?
  - Context of the risk
- What do we want to avoid?
  - Consequences of risk
- What are causes?
  - Mechanisms of risk
- Are things getting worse?
  - Natural trends
  - Ineffective measures

## Risk Management

- What is acceptable?
  - Risk criteria
- How to reduce uncertainty on achieving objectives?
  - Management measures
  - Prevention and mitigation
- Are the measures working
  - Conformity to the measures

# Ecosystem Based Risk Management Process

## Risk Management Context

- Policy and goals
- Stakeholders concerns

## Risk Identification

- Understanding relevant risk

## Risk Analysis

- Level and nature of risk

## Risk Evaluation

- Course of action

## Risk Treatment

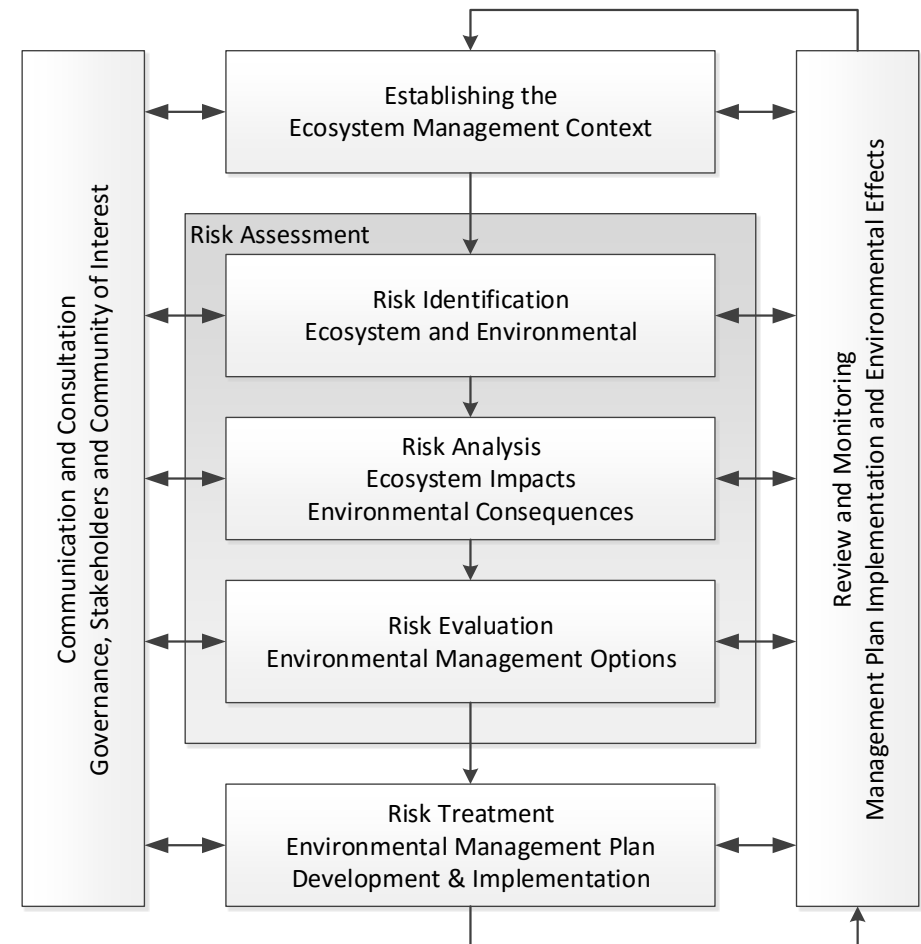
- Management measures

## Communication and consultation

- Feedback and advice

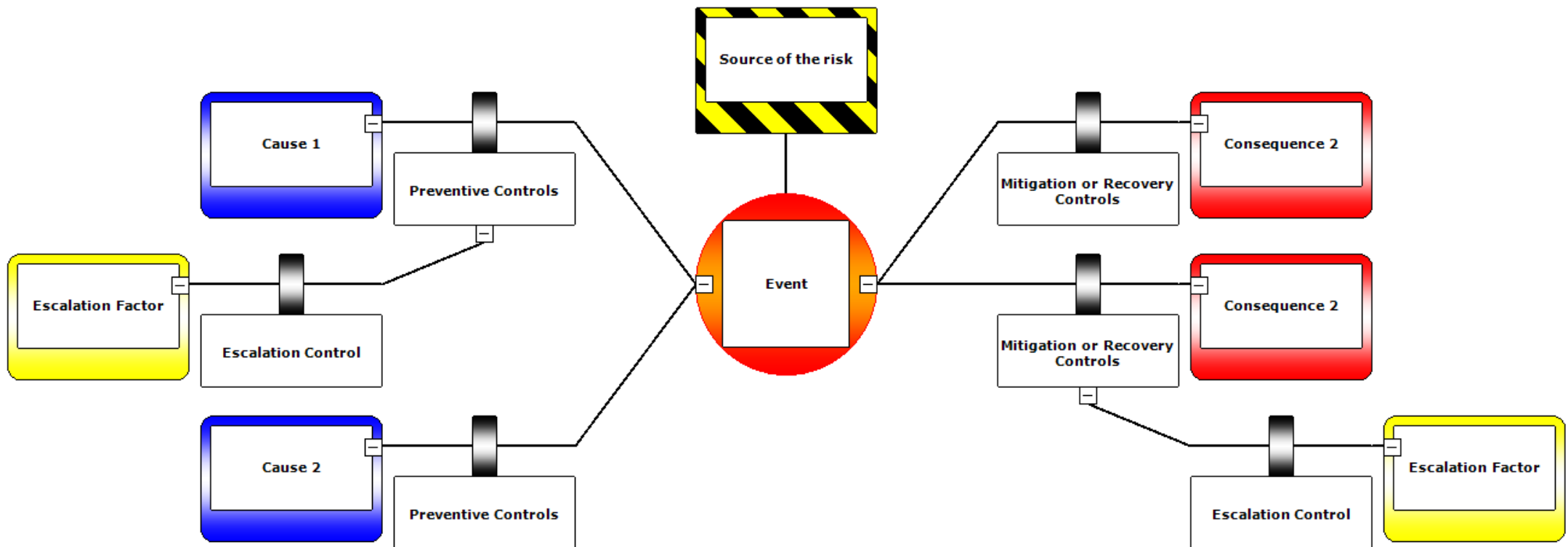
## Review and monitoring

- Continuous improvement



Adapted: ISO 31000:2009

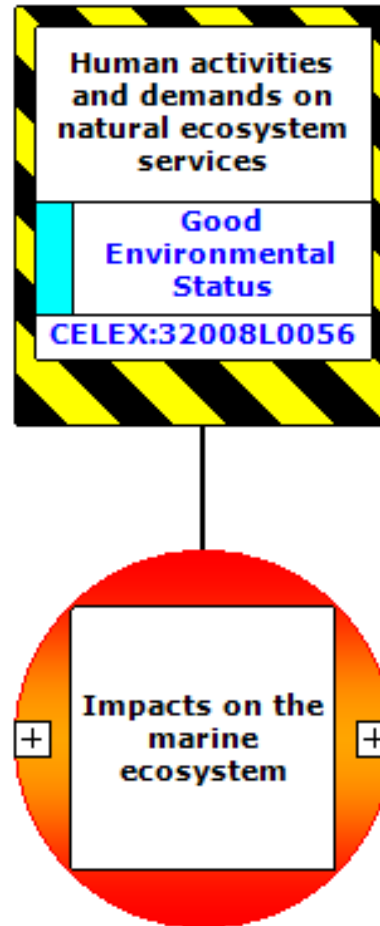
# Bow-tie Analysis of management measures





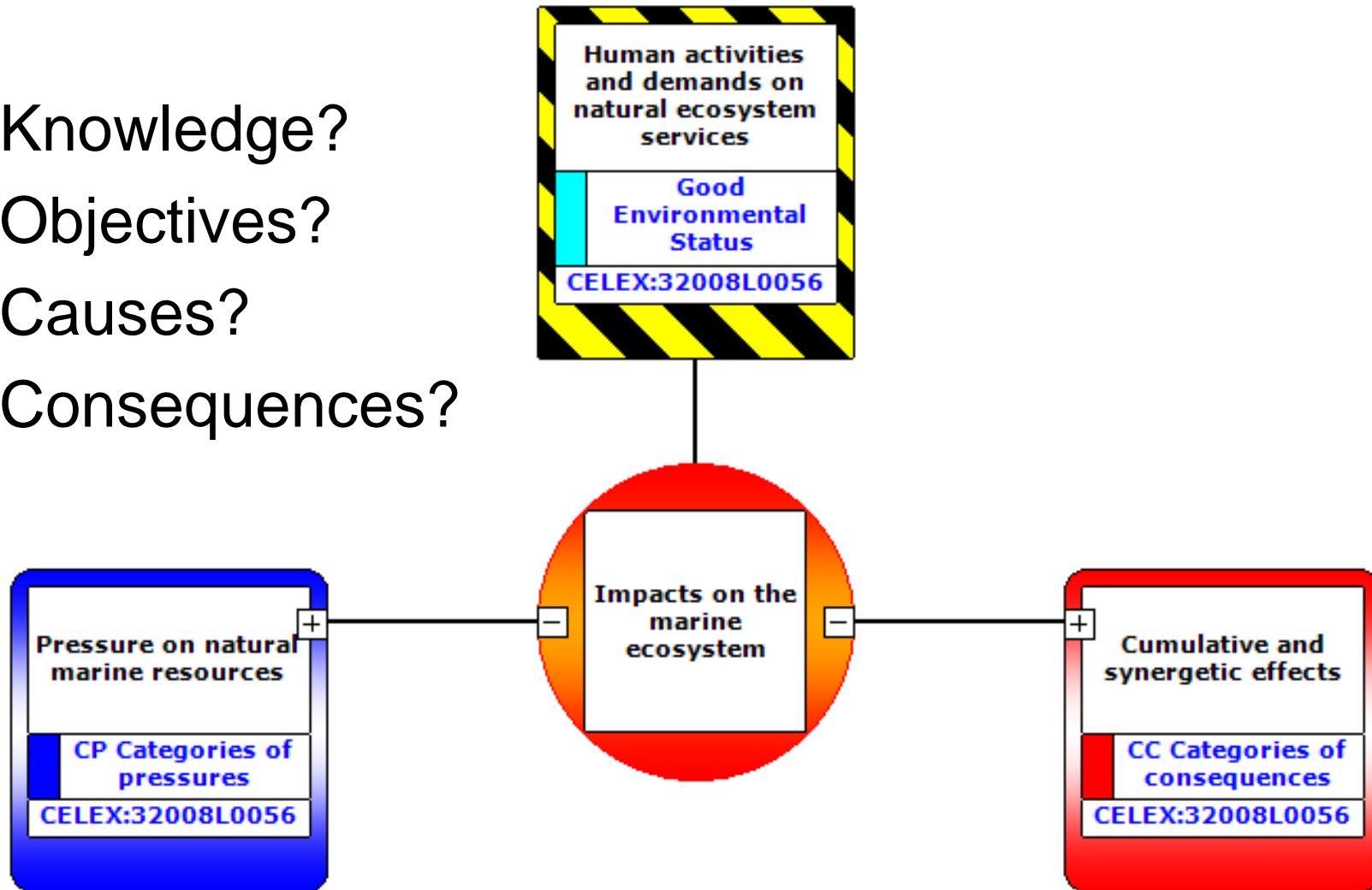
# Risk Management Context?

- Policies?
- Values?
- Concerns?

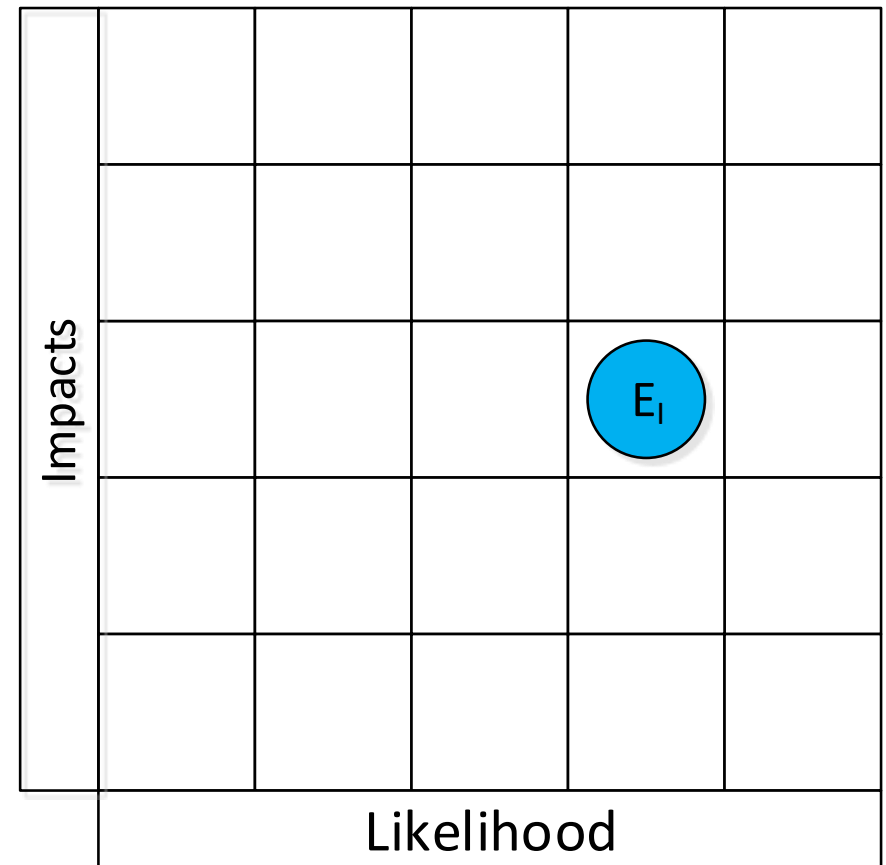


# Risk Assessment: Risk Identification

- Knowledge?
- Objectives?
- Causes?
- Consequences?

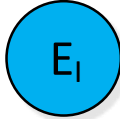


# Risk assessment: Impact Assessment



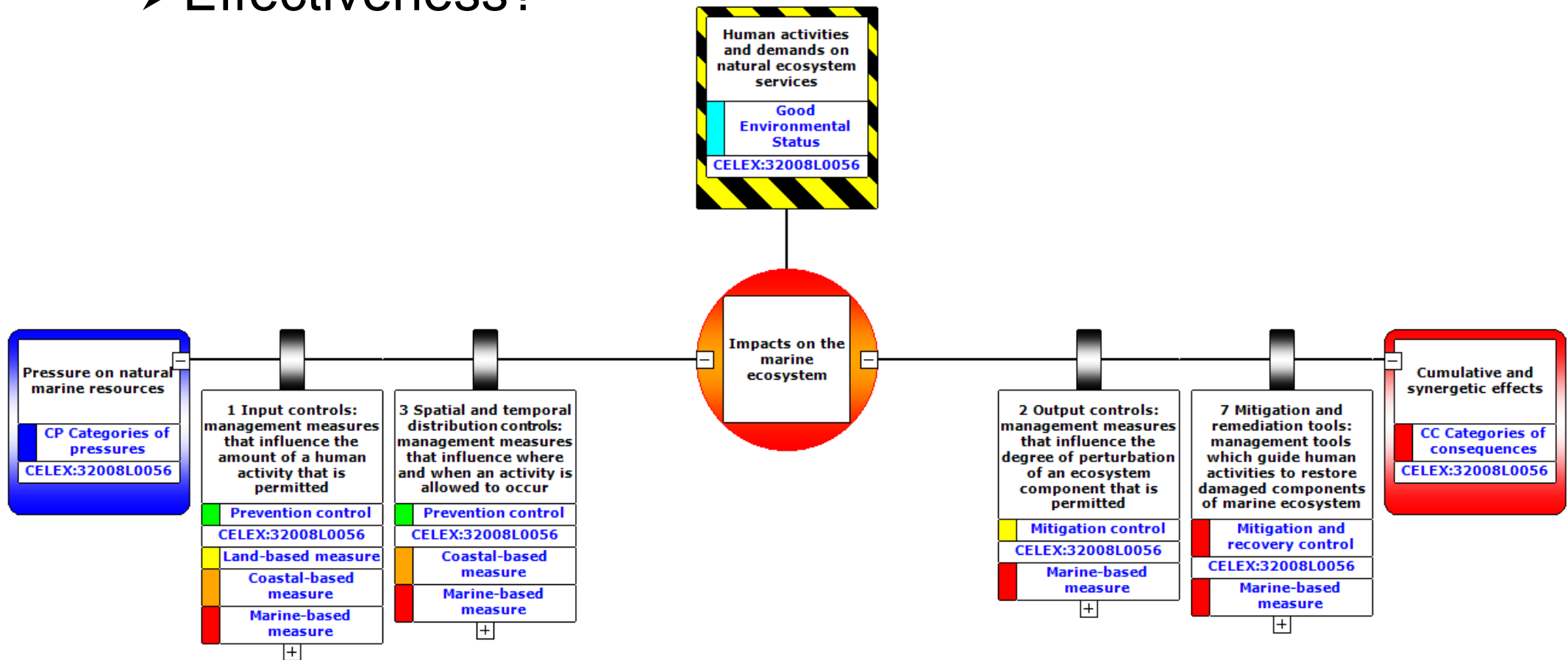
# Risk Assessment: Risk Analysis of Outcomes

## ➤ Nature and level of the risk


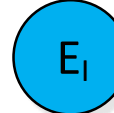

Loss of the ecosystem component or function					
Transition point from changing to loss of ecosystem component or function					
Changing ecosystem component or function					
Transition point from maintenance to changing ecosystem component or function					
Maintenance of the ecosystem component or function					
	Rare	Unlikely	Possible	Likely	Certain

# Risk Assessment: Management Measures

## ➤ Effectiveness?



## ➤ Options for management measures and controls

Loss of the ecosystem component or function					
Transition point from changing to loss of ecosystem component or function					
Changing ecosystem component or function					
Transition point from maintenance to changing ecosystem component or function					
Maintenance of the ecosystem component or function					
	Rare	Unlikely	Possible	Likely	Certain

# Risk Assessment: Risk Evaluation of Tolerability

## ➤ Selection of the options

Loss of the ecosystem component or function					
Transition point from changing to loss of ecosystem component or function					
Changing ecosystem component or function	$P_R$			$E_I$	
Transition point from maintenance to changing ecosystem component or function				$M_R$	
Maintenance of the ecosystem component or function					
	Rare	Unlikely	Possible	Likely	Certain
	<b>Eliminate Risk</b>	<b>New Measures Needed</b>	<b>Improve Existing Measures</b>	<b>No Measures Needed</b>	

## Risk Treatment

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Operational capacities for implementation of the measure

- Training, costs, integration of the measures?

Implementation mechanisms of the measures

- Legislation, standards, guidelines?

Management coordination of implementation

- Authorities, accountability, traceability?



# Concluding remarks

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## Risk Communication and Consultation

- Feedback and advice?

## Risk Management Context

- Policies?
- Values?
- Goals?

## Risk Assessment: Risk Identification

- Objectives?
- Possible scenarios?

## Risk Assessment: Risk Analysis

- Current and future potential consequences?
- Existing management measures and controls?

## Risk Assessment: Risk Evaluation

- Acceptable courses of action?
- Outcomes of management options?

## Risk Treatment

- Operational implementation?

## Review and Monitoring

- Effectiveness of the management measures and controls in achieving outcomes?
- Performance of the management system in achieving objectives?

# The last question: Simple?

