# Tools for reducing environmental impacts of Arctic Operations

Bas Bolman, Wageningen University & Research centre

Amsterdam, 16 October 2013

*Source: Bob Strong, Reuters*

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# 1. About Wageningen UR

# About Wageningen UR

- Explore potential of nature to improve the quality of life
- Annual turnover € 650 Million; 5,000 employees
- Arctic Programme: > € 2 million
- Arctic publications: > 200
- Arctic projects: 10
- Arctic PhDs: 8

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*Photo by Bas Bolman, IMARES*

# Key expertise

- Environmental & socio-economic assessments
- Governance, stakeholder & institutional analysis
- Marine Spatial Planning & GIS
- Environmental monitoring
- Mesocosms & bioassays
- Ballast Water Test Facility

*Photo: IMARES*

# Arctic Projects


*Source: www.geographicguide.com*

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# 2. Challenges for the maritime sector

# Challenges 1/2

How to.....

- deal with static environmental requirements?
- minimise impacts during design of operations?
- sustain & enhance ecological values?

*Source: www. averytoday.com*

# Challenges 2/2

How to.....

- be involved in formulation of standards & regulations?
- get a formal and informal license to operate?
- involve stakeholders and create legitimacy?
- deal with uncertainties & knowledge gaps?

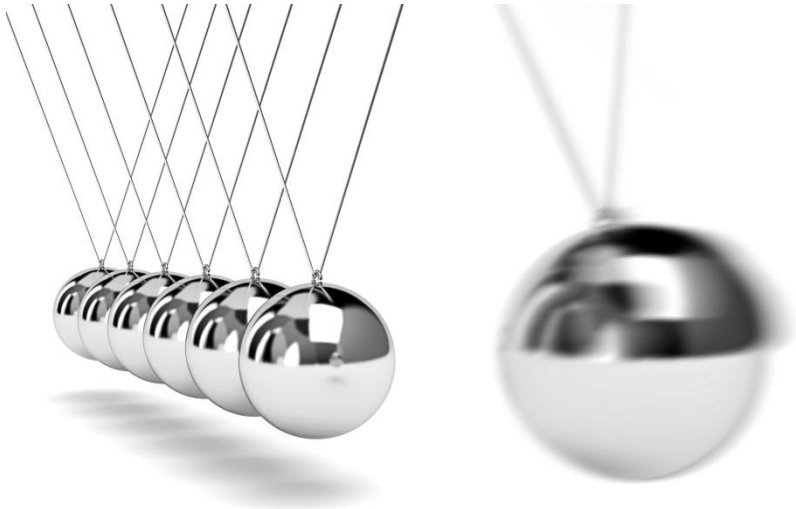
*Source: www. faithfulbloggers.com*

# 3. Past, present and future operations

# Past/current maritime operations

## A perpetuum mobile?

1. Design of "interference"
2. Calculation of effects (surprises)
3. Design mitigation measures (second best)
4. Compensate remaining effects
5. Law suits at court
6. Start over again



*Source: www.gcpr.net*

# Future maritime operations

## Building with Nature & Ecosystem Based Approach

1. Understand the environment (ecosystem)
2. Design “smart” interference, optimise nature’s potentials
3. Involvement and participation of stakeholders
4. Implementation of the operation
5. Monitor environmental effects
6. Stakeholders report together

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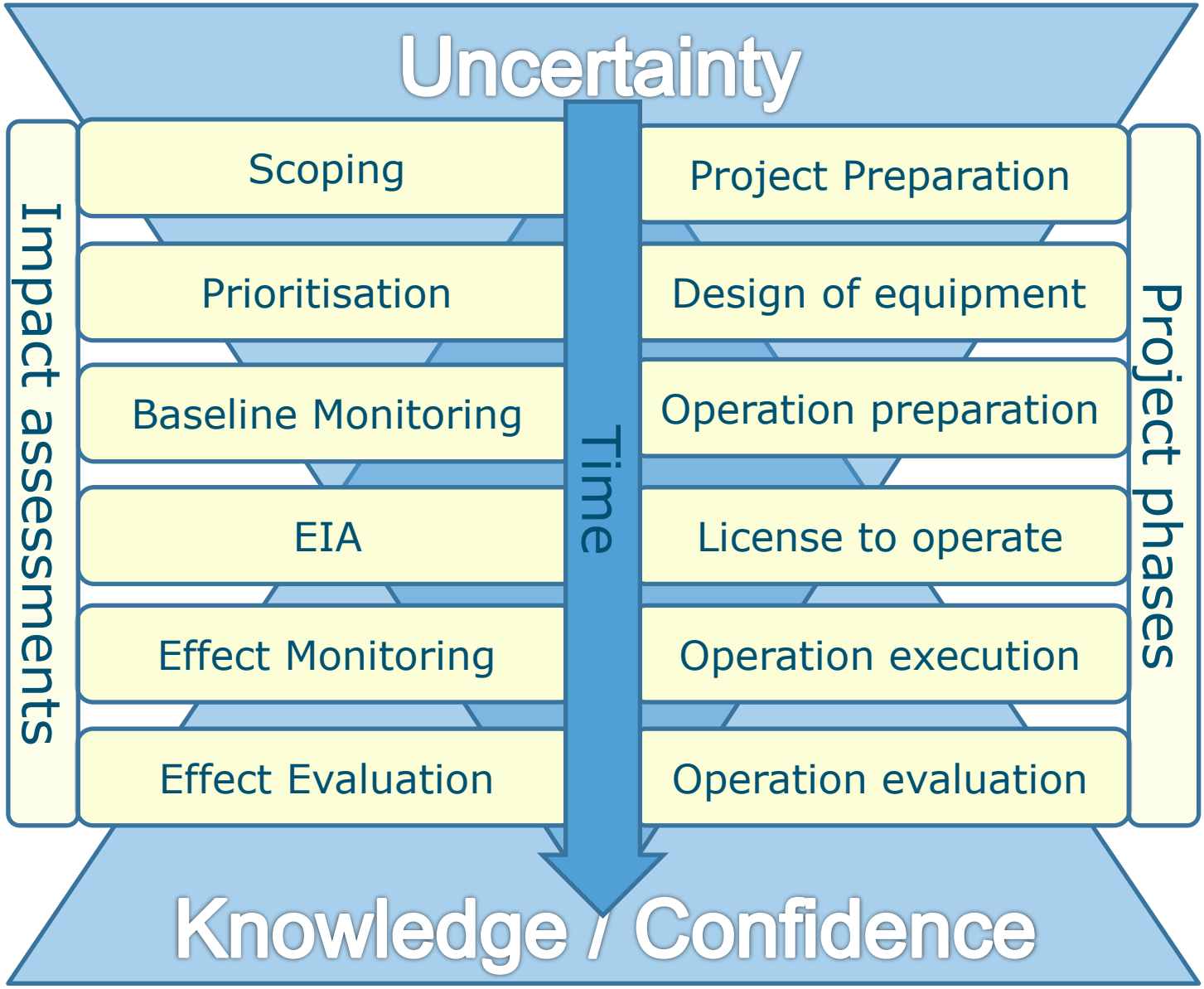


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# 4. Cases

# JIP Arctic Operations Handbook

## Generic framework


Trenching in Baffin Bay, Canada

- Comply with (inter)national regulations & standards
- Efficient knowledge management & utilisation
- Develop in continuous interaction with stakeholders

Canatec Associates International Ltd.

Allseas

SBM OFFSHORE

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HEEREMA

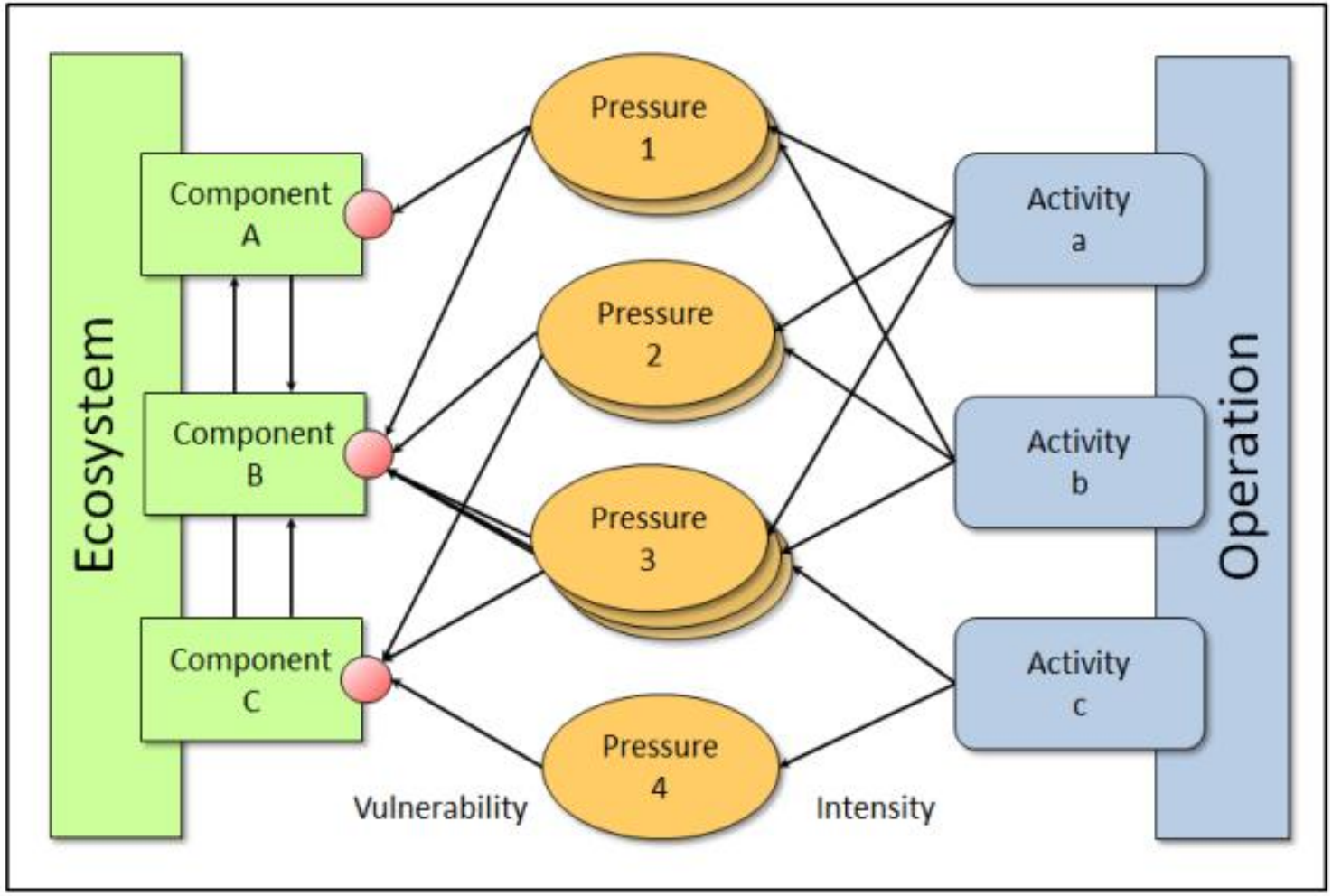
IHC MERWEDE

bluewater Power by People

# Results

- Standard procedure for preparation & equipment design
- Effect = pressure intensity x ecosystem vulnerability
- Qualitative approach results in scoping of effects
- Semi-quantitative approach results in relative effects
- Quantitative approach results in actual effects
- Compare environmental impact of trenching equipment

# Generic Framework




*Source: Karman & Jongbloed (2008)*

# Spitsbergen Expedition 2013

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# 5. New initiatives

# Joint Industry Project Ecological Impacts of Arctic & Deep Sea operations


- Extend the integral approach of Generic Framework
- Understand functioning of Arctic & Deep Sea ecosystems
- Inspire and involve international community
- Suitable for scoping, prioritization and EIA license
- Verify with real life case studies in Arctic & Deep Sea
- Utilise Building with Nature principles

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# Thank you for your attention!


bas.bolman@wur.nl

+31 317 487703

www.arctic.wur.nl

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www.TriplePatSea.nl

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