In-water cleaning

Ministry for Primary Industries
Manatū Ahu Matua

How do we know it works?

Dr Eugene Georgiades, Abraham Growcott, Dr Daniel Kluza
Biosecurity Risk Analysis (Animals and Aquatic)

Prevention First 2016

www.mpi.govt.nz

Background

- A regulatory update
- Aus and NZ in-water cleaning guidelines
- MPI and in-water cleaning
- Current MPI research!


Image: MPI


Image: DiveCo Ltd

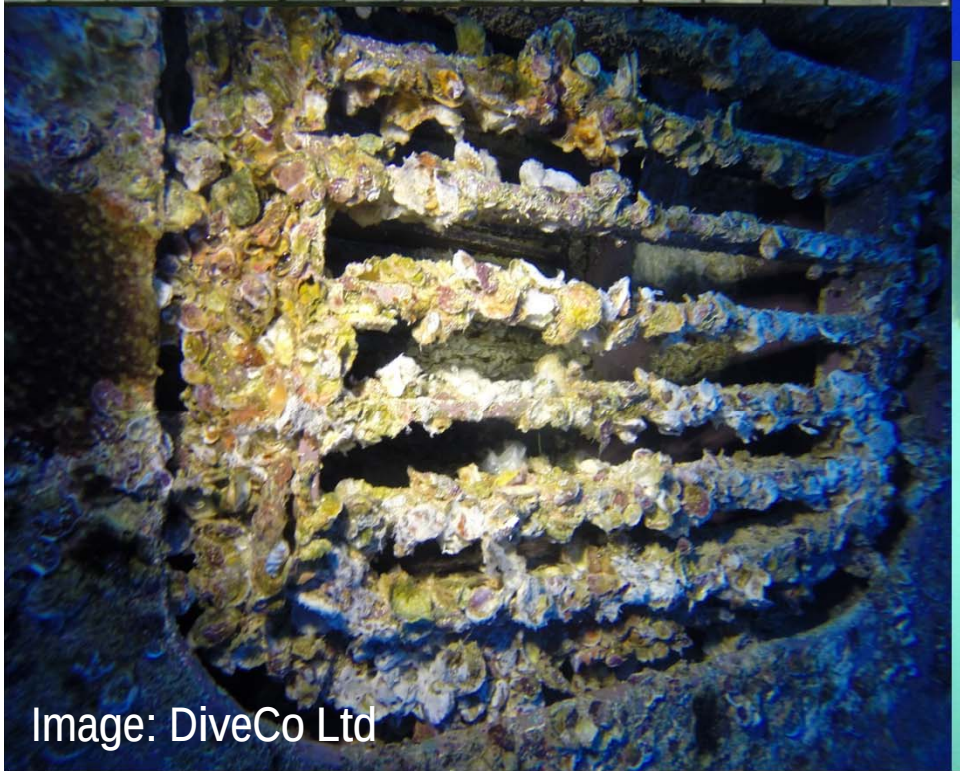


Image: DiveCo Ltd

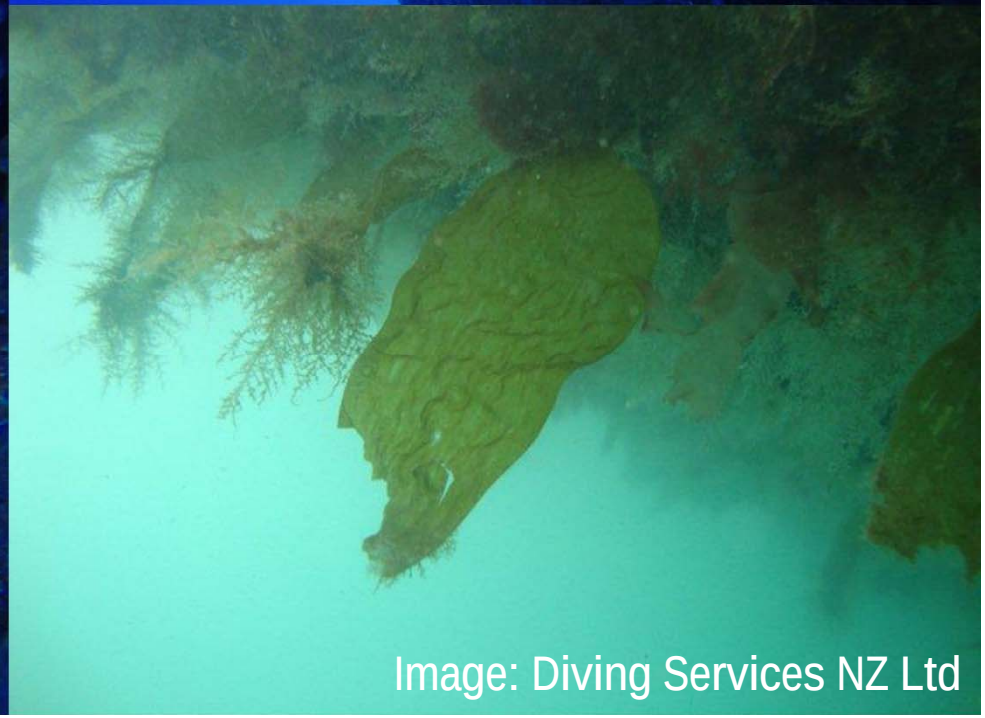


Image: Diving Services NZ Ltd


Image: Roger Grace


Image: Roger Grace


Image: Dept. of Fisheries


Image: Roger Grace

New Zealand Regulatory Update

- Craft Risk Management Standard for Vessel Biofouling signed off
- 4 year “early adoption period” (voluntary)
- Mandatory regulation to begin May 2018
- Alignment with IMO Guidelines
- Risk minimisation

For more details

- Standard

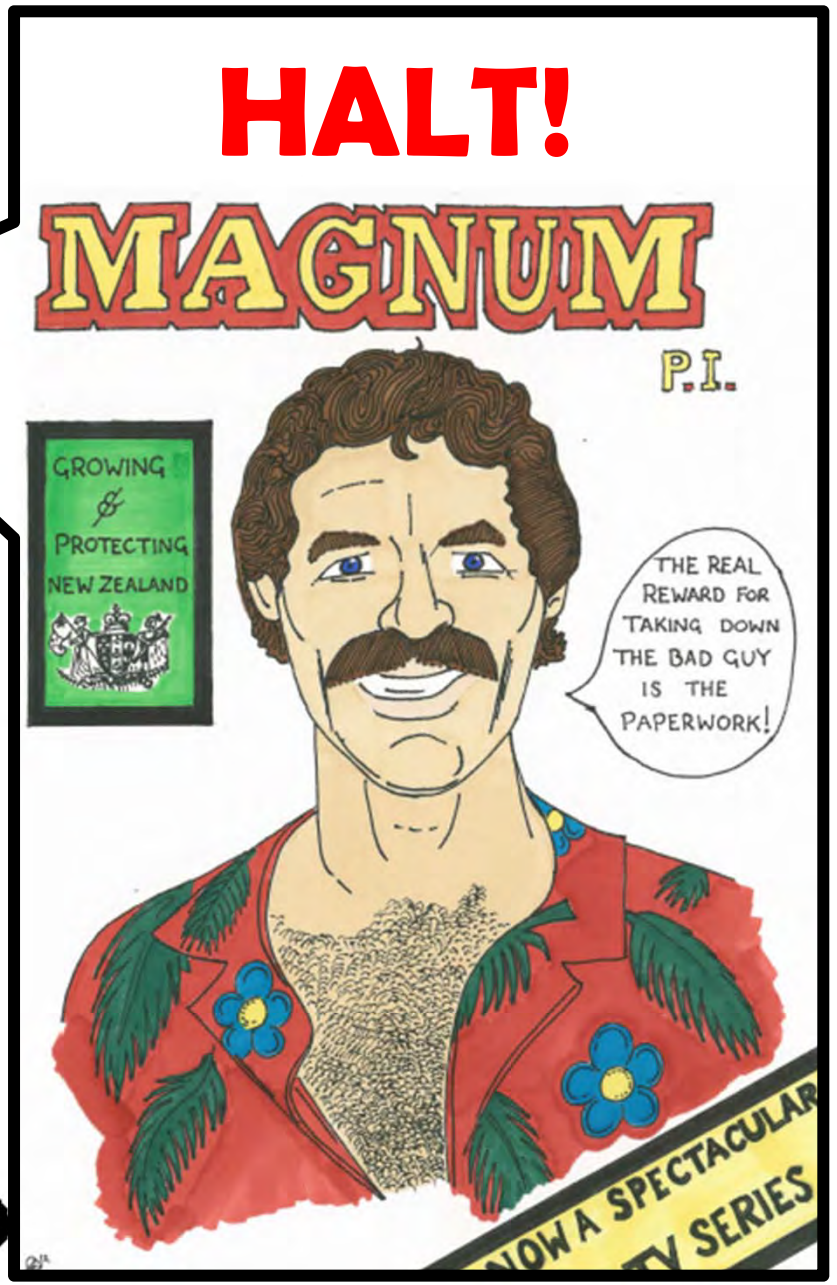
https://mpi.govt.nz/document-vault/11668

- Science underpinning standard

http://www.mpi.govt.nz/document-vault/4148

http://www.mpi.govt.nz/document-vault/2863

2018



But there is much to do....

e.g., in-water cleaning?

Scenarios for in-water cleaning

- International context
  - IMO guidelines
    - Routine maintenance
  - New Zealand CRMS
    - Routine maintenance
    - Tools for urgent vessel treatment
- Domestic context
  - Range extensions
  - Routine maintenance
  - Pathway management

Image: Diving Services NZ Ltd

Summary: NZ in-water cleaning research

- 2016
  - Frameworks for testing in-water cleaning systems (internal areas)
- 2015
  - Frameworks for testing in-water cleaning systems (external hull)
- 2013
  - Australian and New Zealand Guidelines for in-water cleaning
  - In-water cleaning of vessels: Biosecurity and chemical contamination risks
- 2012
  - Scenarios of vessel biofouling risk and their management
- 2009
  - Review of options for in-water cleaning of ships
- 2008
  - Determining the efficacy of incursion response tools:
    Rotating brush technology (coupled with suction capability)

“Vessel dry-docking in Singapore” Daniel Kluza (MPI)

New Zealand (and Australia): In-water cleaning

- 1997
  - Code of Practice for Anti-fouling and In-water Hull Cleaning and Maintenance (ANZECC Code).
  - Concerns
    - Release of biocides
    - Establishment of non-indigenous species
- 2009
  - Code reviewed
- 2013 +
  - Guidelines released
  - Undergoing review 2017

NO!

Yes but…

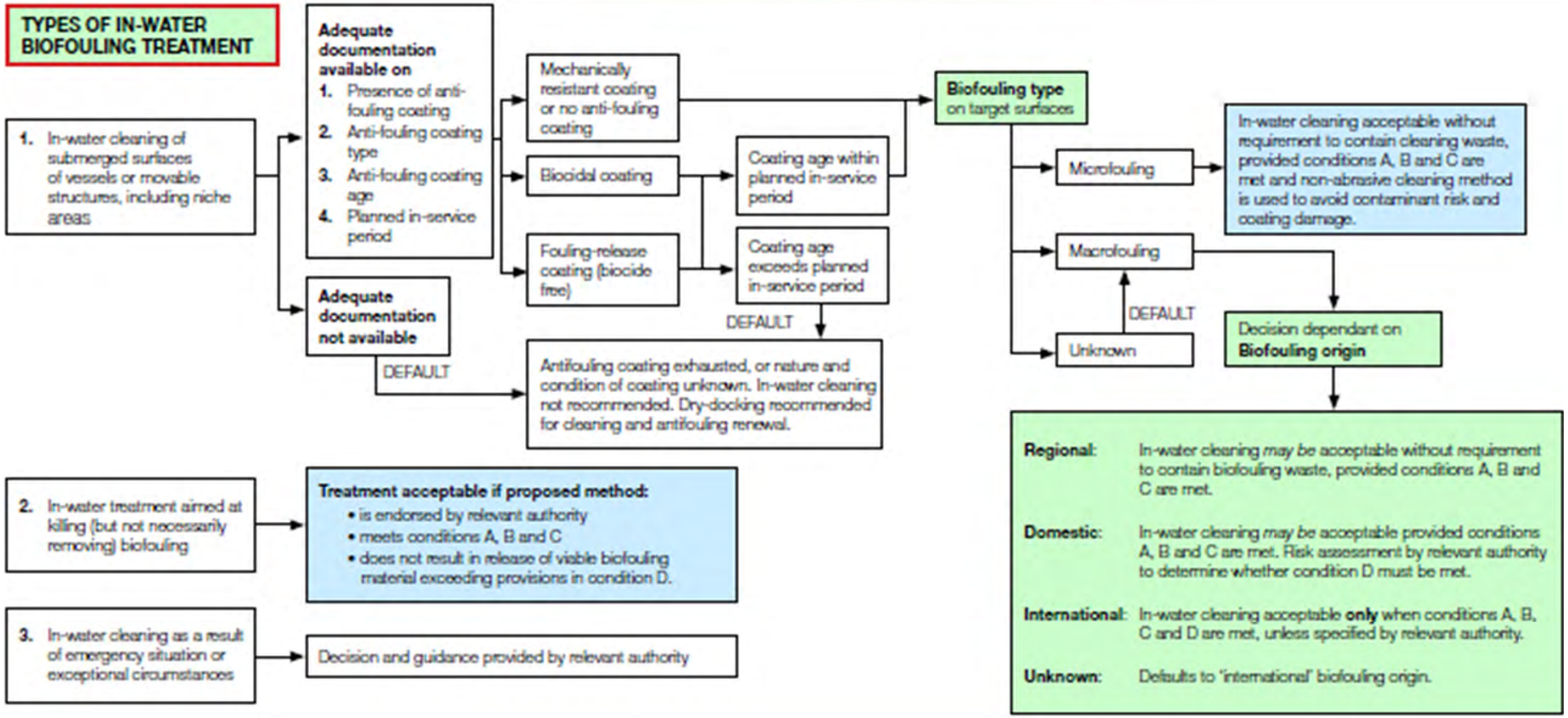
Image: DiveCo Ltd

New Zealand (and Australia): In-water cleaning

- Guidelines (principles)
- In-water cleaning
  - Regular is effective
  - Not a substitute for poor practice
  - Suitable anti-fouling coatings only
  - Not suitable on coatings at the end of their service life
- Clean before you leave
- Minimise discharges

Image: DiveCo Ltd

New Zealand (and Australia): In-water cleaning



Conditions for removal and/or treatment of biofouling:

A: Anti-fouling coating is suitable for cleaning/treatment.

B: Cleaning/treatment method does not damage coating surface.

C: Discharges meet local standards or requirements.

D: Cleaning/treatment method ensures that release of biological material into the water column is minimised through the capture and containment of biofouling waste. Cleaning method should aim to, at least, capture debris greater than 50 µm in diameter which will minimise the release of viable adult, juvenile and larval stages of macrofouling.

New Zealand (and Australia): In-water cleaning

- Decision Support Tool for in-water cleaning
  - Anti-fouling coating
    - Presence, type, age, length of service life
  - Fouling
    - Type, origin
  - Method
    - Type, suitability, re-capture ability, discharge

Image: DiveCo Ltd

Balancing the risks of in-water cleaning

Morrisey et al. 2013

Research question

"When do the environmental costs of releasing non-indigenous species and chemical contaminants during in-water cleaning outweigh the risks of no action?"

- Findings
  - Biocide free paints **(acceptable)**
    - Slime layer
    - Vessels with < 15% fouling (with recapture)
  - Biocidal paints **(acceptable but…..)**
    - Depends on vessel size and % fouling cover

Image: NZ Diving and Salvage Ltd

What are you doing now New Zealand?

Research question

"How do you determine that the in-water cleaning system actually works with respect to minimising the biosecurity risk?"

Image: Diving Services NZ Ltd

Framework for testing in-water cleaning systems

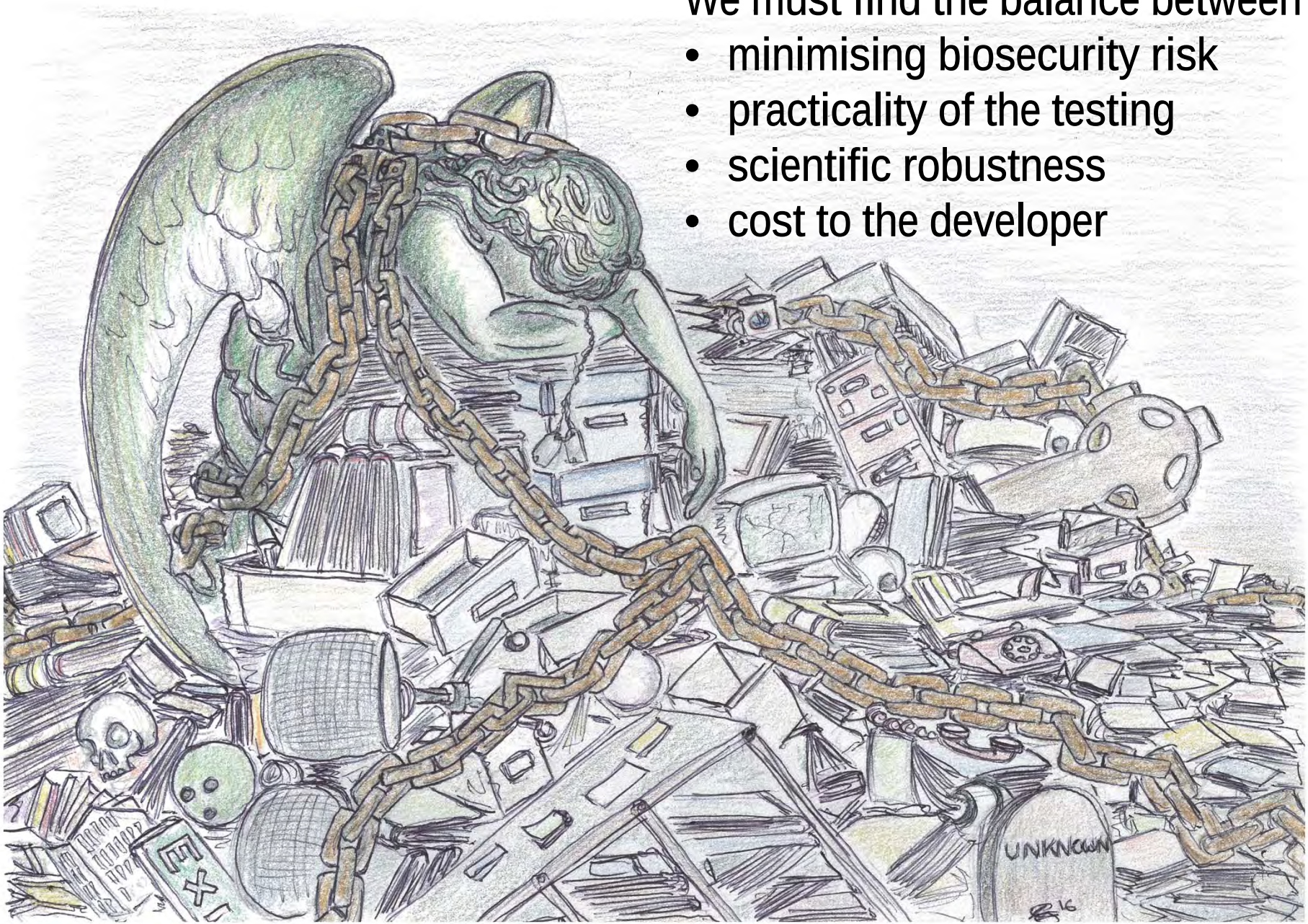
Graeme Inglis, Leigh Tait, Chris Woods - NIWA Ltd
Don Morrisey – Cawthron Institute
John Lewis – ES Link Services Pty Ltd

- Objective
  - Develop standard testing requirements for in-water cleaning systems with respect to biosecurity risk
- Approach
  - Categories
  - Investigation of biosecurity risks
  - Standard setting
  - Test development

Image: NIWA Ltd

We must find the balance between

- minimising biosecurity risk
- practicality of the testing
- scientific robustness
- cost to the developer



Framework for testing in-water cleaning systems

- Categories
  - Mechanical (e.g. brushes, water jets)
  - Manual (e.g. hand tools)

} Removal systems

  - Surface treatments (e.g. heat, ultra sound)
  - Shrouding technologies (e.g. encapsulation, enclosure)

} Treatment systems

Image: NIWA Ltd

Framework for testing in-water cleaning systems

- Literature review
  - Biosecurity risks associated with:
    - Set up / accessing the hull
    - Cleaning water-line
    - Cleaning general hull, niche areas and edges
    - Capture of waste material
    - Filtration / treatment of waste material
    - De-mobilsation

Image: NIWA Ltd

Framework for testing in-water cleaning systems

- Performance standards for testing
  - Manual and mechanical systems
    - Removal of all visible, macroscopic biofouling
  - Shrouding and surface treatment systems
    - All biofouling rendered non-viable
  - Effluent treatment
    - Maximum particle size (12.5 µm) *or*
    - Non-viable *or*
    - Not discharged

Image: NIWA Ltd

Framework for testing in-water cleaning systems

- General test requirements
  - Vessel testing using the full system
  - Simulation of intended use
  - Evaluation conducted by approved, independent contractor

Image: NIWA Ltd

Framework for testing in-water cleaning systems

Factors considered

- System types
  - Mechanical removal
  - Manual removal
  - Surface treatments
  - Shrouding technologies
- Vessel areas (& types)
  - Flat
  - Curved
  - Niche
  - Wind-and-water line
  - Whole vessel
- Fouling types (& cover)
  - Moderate soft
  - Moderate hard
  - Heavy hard
- Paint types
  - Biocidal
  - Non-biocidal
- Environment
  - Current speed
  - Sea conditions
  - Visibility, etc

Image: NIWA Ltd

Framework for testing in-water cleaning systems

Guidance provided on

- Provision of system information
  - Mechanism of action
  - Technical specifications
  - Intended application
  - Standard operating procedures
- Conduct of the test
  - Independent oversight
  - Choice of vessels
  - Level of replication
  - Environmental conditions
- Test methods
  - Vessel surfaces / regions
  - Types and level of biofouling
  - Effects on anti-fouling coatings
  - Waste capture and treatment
- Data recording
  - Type
  - Reporting templates
- Rationale
  - Why?
  - Cost

Image: NIWA Ltd

Testing efficacy of in-water cleaning systems

- Summary
  - Framework
    - Transparent, robust and practical
    - Will inform MPI's requirements
    - Industry certainty regarding MPI expectations
    - Independent
    - Cross jurisdiction approval

In-water cleaning technologies – Review of information
http://www.mpi.govt.nz/document-vault/10814

Procedures for evaluating in-water systems to remove or treat vessel biofouling
http://www.mpi.govt.nz/document-vault/10811

Image: NIWA Ltd

Operation sea chest!

Abraham Growcott
Dan Kluza
Eugene Georgiades
MPI

- Niche areas
  - Small proportion of the hull
  - High susceptibility to biofouling
  - Increased fouling abundance and diversity relative to hull
  - Reactive measures to mitigate biosecurity risk?
- Research objectives
  - Evaluate reactive methods
  - Develop data requirements for efficacy testing
- Literature review
  - In-water systems to remove or treat biofouling in vessel sea chests and internal pipework www.mpi.govt.nz/document-vault/11821

Image: DiveCo Ltd

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In-water cleaning – what are we protecting?

- Considerations
  - Biosecurity risk
  - Chemical contamination risks
  - In-water cleaning technology
- Approach
  - Act with the technology available now?
  - Wait for technological improvement?

Image: New Zealand Diving and Salvage Ltd

Other MPI biofouling-related Operational Research

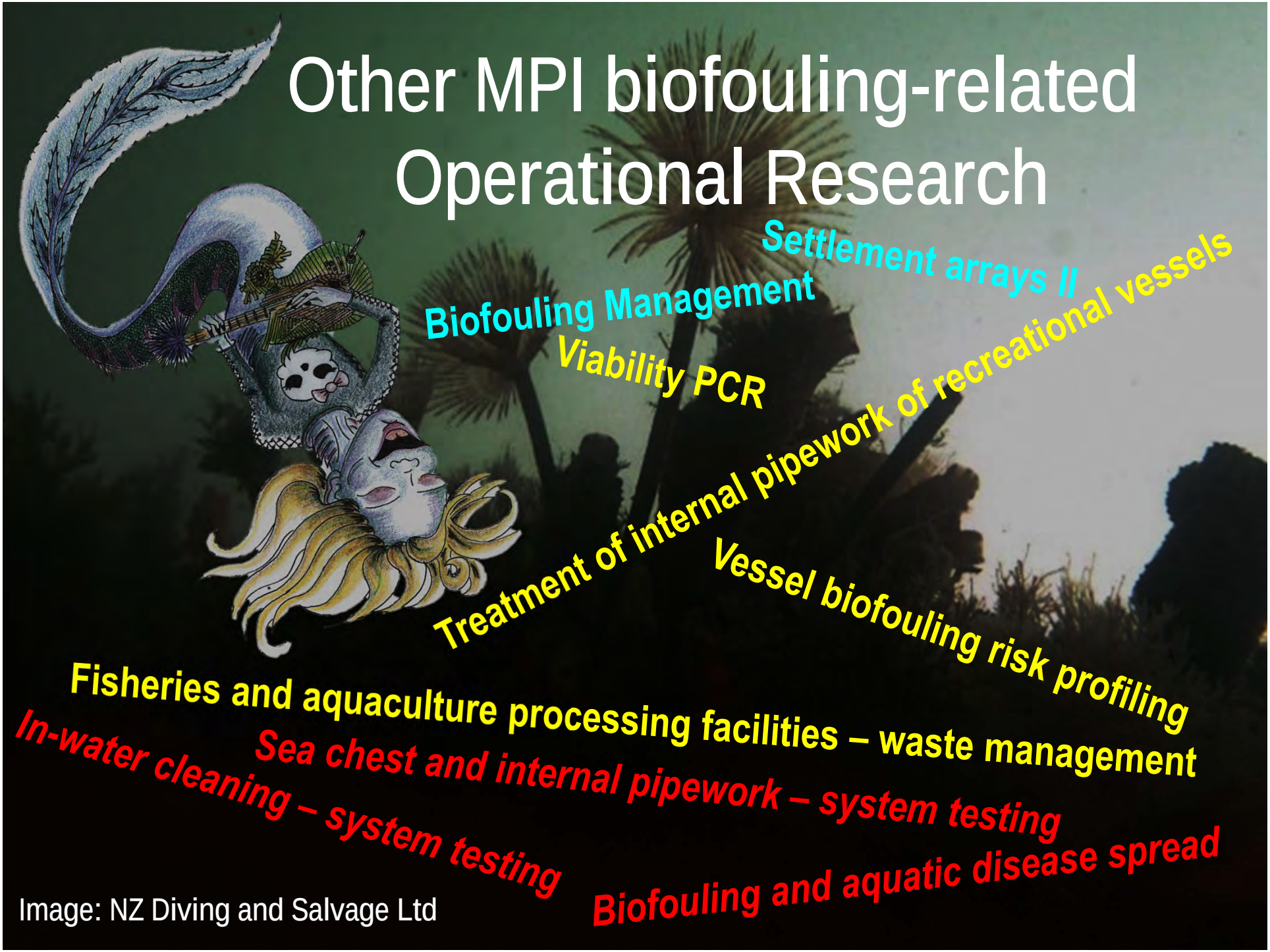

Image: NZ Diving and Salvage Ltd

Acknowledgements

- Service providers
  - NIWA Ltd

  (Graeme Inglis, Don Morrisey*, Chris Woods, Leigh Tait)
  - ES Link Services Pty Ltd (John Lewis)

- In kind support
  - Dept. of Fisheries Western Australia (Justin McDonald)
  - Australian Dept. of Agriculture and Water Resources (Sonia Gorgula)
  - California State Lands Commission (Chris Scianni)

- MPI
  - MPI Operational Research Team!
  - Biosecurity and Environment Group, Response Group, Long-term Incursion Management Group, Aquaculture Unit, Bacteriology and Aquatic Animal Diseases, Surveillance and Incursion Investigations

Image: DiveCo Ltd

Questions?

You know where to find me……..