



Science perspectives on TOS marine biosecurity



TOS Partnership Meeting

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Outline of talk

- Biosecurity management overview and context for TOS work
- TOS progress and pros/cons of different management approaches
- Way forward?



Marine Biosecurity Management

Management goals from
prevention to cure

International border control



Detect and eradicate new
incursions to NZ



Reduce domestic spread



Reduce regional risk



Manage adverse effects

Supporting management
activities

Pre-border standards for
international arrivals (MPI)

Target species port surveillance
and pest response (MPI)

Risk pathway management
(MPI/Others)

TOS and other activities
(regional responsibility)

All who need to (e.g.
aquaculture)

Pre-border pathway controls and “leaky” borders



Import Health Standards (e.g. for ballast water)



Craft Risk Management Standard for biofouling
(mandatory from 2017?)



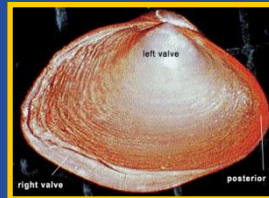
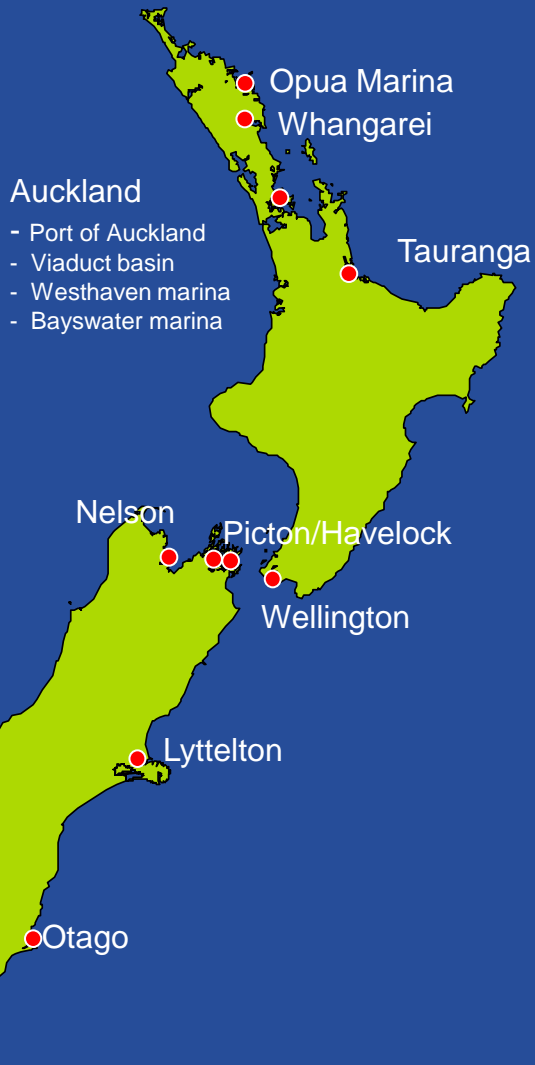
Sea chests
overlooked



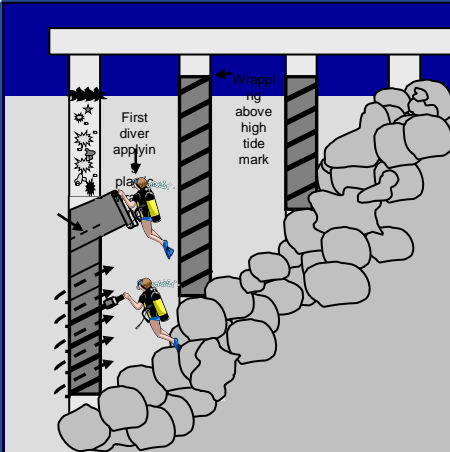
Six-monthly high risk site surveillance

5 primary targets
(pests not in NZ)

6 secondary
(pests in NZ)



Incursion response - limited success



- Pests detected too late to eradicate (or acted upon too late)
- Simple management tools effective only at small scales
- Marine environment difficult to work in
- High costs of surveillance and response

Bleach/Lime

X X

Acetic acid

X ✓

Heat/steam

X ✓

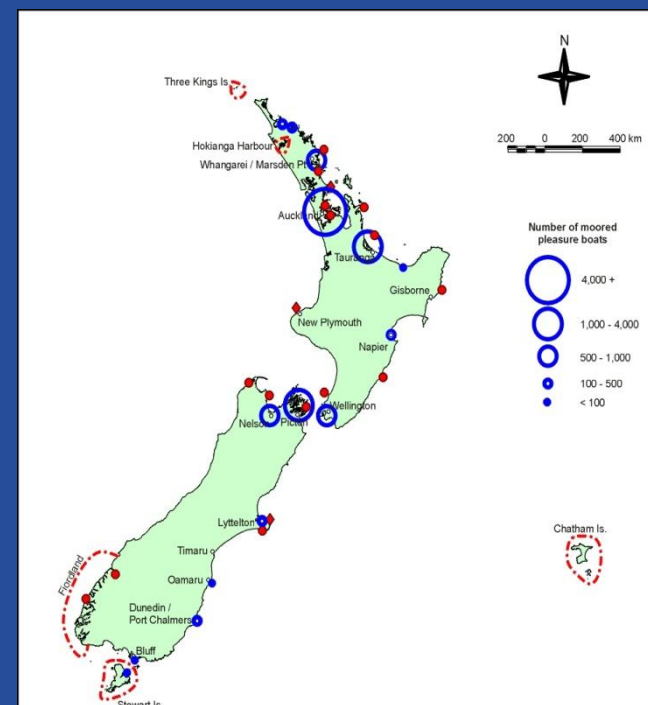
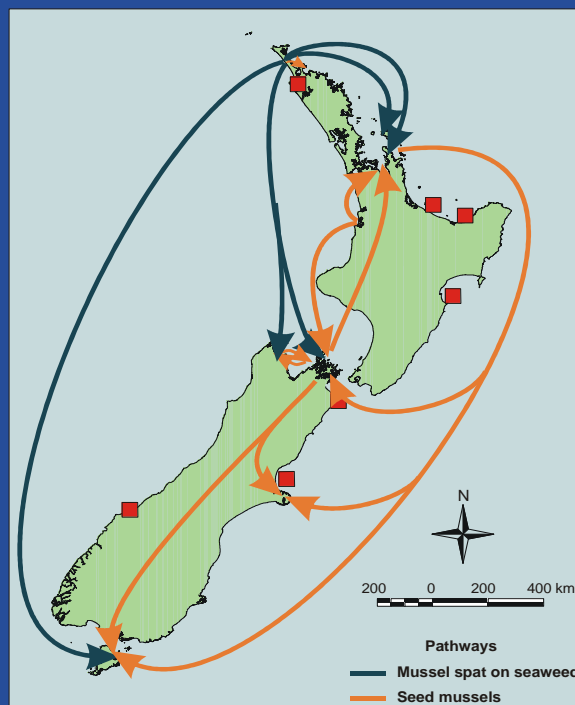
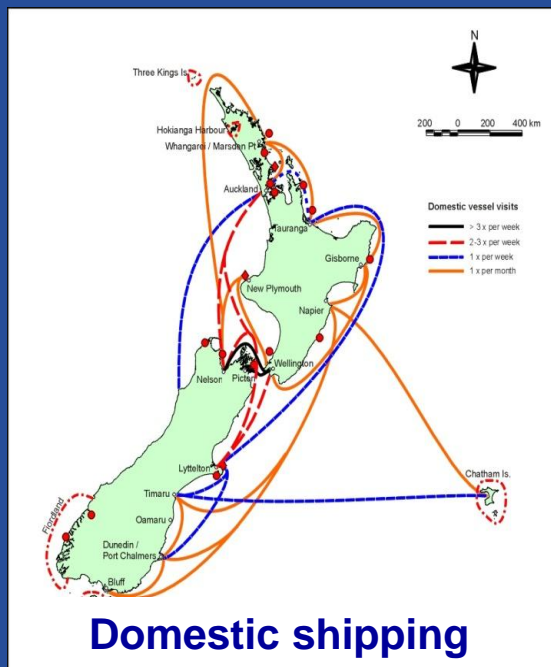
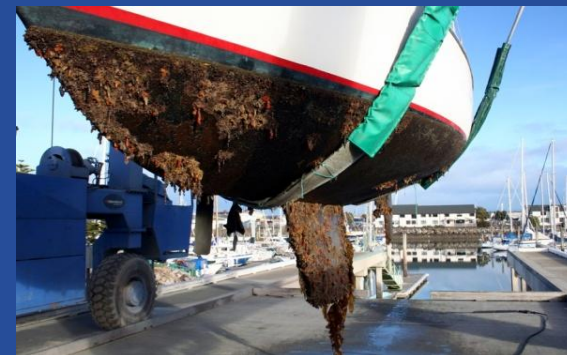
Freshwater

✓ ✓



New incursions invariably spread domestically, mainly with human activities

Domestic risk pathways and mechanisms



Implications for TOS

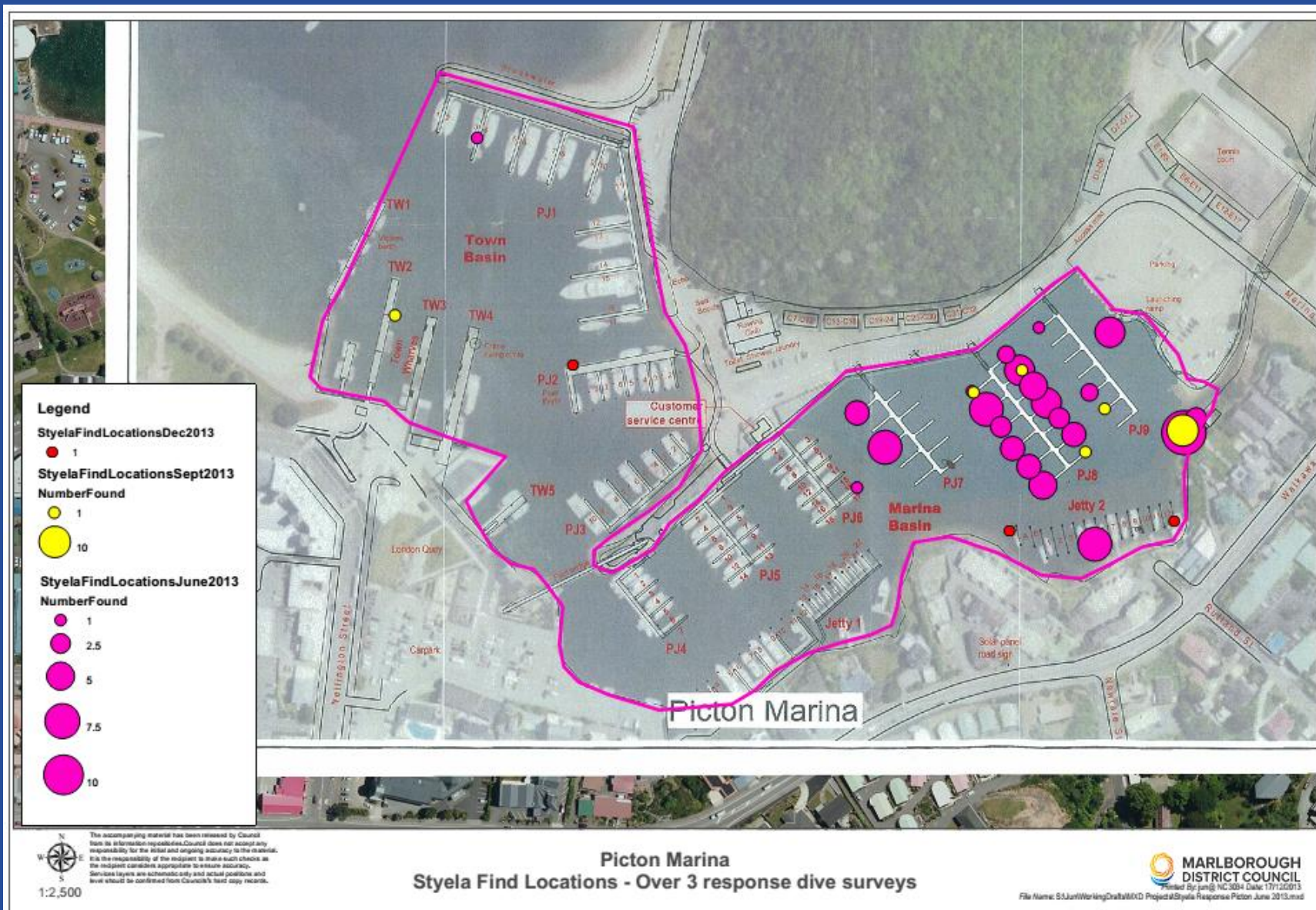
- Manage risk pathways into and within the TOS (fouling, bilge water, contaminated gear etc)
- Manage target pests, even though they may not be managed nationally
- In either case, the best outcome will usually be that marine pest spread is reduced regionally

Clubbed sea squirt (*Styela clava*)

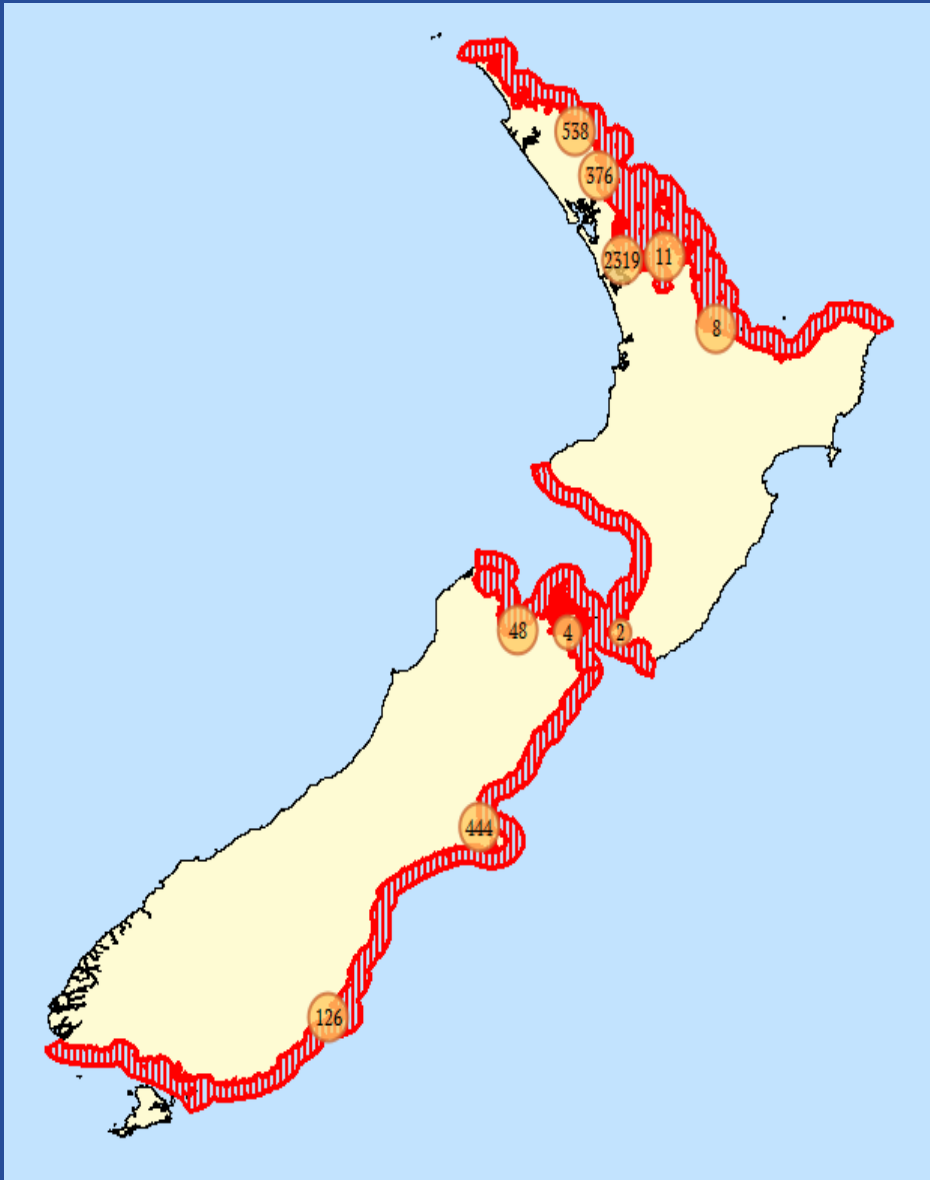
- Potentially high aquaculture impact
- Discovered in NZ in 2005
- Initially managed by MPI in Auckland & Lyttelton, but discontinued
- Nuisance to aquaculture in Hauraki Gulf
- Discovered in Picton, June 2013
- Decision by MDC to manage in Picton based on benefits to aquaculture of slowing spread



Clubbed sea squirt in Picton



Clubbed sea squirt NZ distribution



Multiple source regions in NZ for ongoing spread into TOS

Over time, increasingly likely that spread into TOS will be outside vector hubs

Sea squirt could already exist in other places in TOS

Hot off the press - clubbed sea squirt in Waikawa Bay



Mediterranean fanworm (*Sabella spallanzanii*)

- Potential impact, especially to natural ecosystems
- Discovered in NZ in 2008
- Initially managed by MPI in Auckland and Lyttelton, but discontinued
- Discovered in Nelson Nov 2013, and Waikawa Bay Feb 2014
- Decisions pending on future management....what are the benefits of slowing spread?



Fanworm in TOS

Nelson marina fanworm (*Sabella spallanzanii*)

- = NIWA discovery Nov 2013 (1 worm)
- = Bruce Lines Dec 2013 (11 worms)
- = Bruce Lines April 2014 (22 worms)
- V = *Sabella* found on vessel
- (A) = Marina pontoon finger

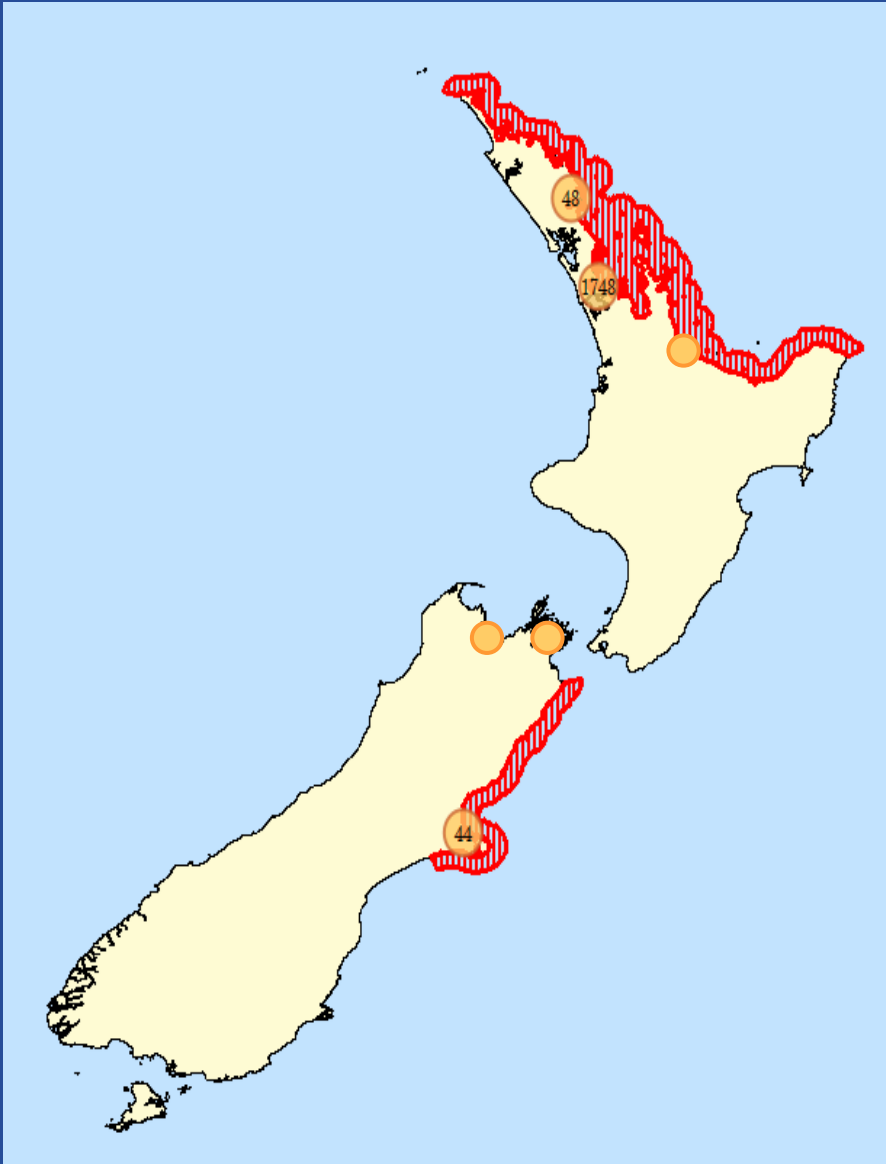
Note: locations show individual fanworms and are approximate



Well established in Nelson marina – detection difficult

Found on one vessel in Waikawa Bay

Fanworm NZ distribution



Multiple source regions for ongoing spread into TOS (e.g. recently found in sea chest of ship on routine route into Nelson)

Over time, increasingly likely that spread into TOS will be outside vector hubs

Fanworm could already exist in other places in TOS

Karmic cycle of marine pest management

Pest well-established when detected



Failed attempt to eradicate or contain incursion



Pest spreads beyond managed area, and budgets get diluted



Funding discontinued



Uncontrolled spread

EXAMPLES

Undaria 1999-2004, 2008/9

Didemnum 2003 & 2006-2008

Styela 2005....

Fanworm 2008....

EXCEPTION?

Undaria in Breaksea Sound

Pests vs Pathways for TOS?

Pest population management:

- Provides tangible focus for efforts
- Easier to motivate support for a tangible risk
- Intensive population control may fail to eradicate, but in vector hubs (e.g. ports, marinas) can greatly reduce vector risk

but:

- High cost, must be ongoing because of unmanaged populations and pathways outside TOS
- Only practical to intensively manage small areas
- Focus on 'high-risk' exotic pests whose potential impacts may not eventuate, or be less than other unmanaged species

Pests vs Pathways?

Pathway management

- Focus on prevention before cure
- Inclusive of a broad suite of species & life-stages, and risk mechanisms (e.g. fouling, bilge, infected gear)
- Inclusive of known and potential pests, irrespective of:
 - Geographic origins (e.g. main aquaculture pests are native, internal border issues)
 - Geographic spread of established exotics (e.g. *Undaria*)

but:

- Willingness – perception of responsibility and concern re costs, etc

Implications for TOS

- Pathway focus a logical priority, and provides best bang for buck, but not reflected in TOS actions in last 12 months:
 - Pathway management: ca. 20K direct costs
 - *Styela* & fanworm control: ca. 125K direct costs (not incl support from MPI, DOC, PML, etc)
- Scope for TOS to develop pathways-based approach, building on existing MPI work and guidance
- Need to evaluate where regional population management sits as a tool to manage specific pests. What pests should be targeted and why?

THE ROAD TO ENLIGHTENMENT IS
LONG AND DIFFICULT, WHICH IS WHY
I ASKED YOU TO BRING SANDWICHES
AND A CHANGE OF CLOTHING.

