

# International & Australian risk management activities for hitchhiker and contaminating pests

24 June 2021

HEALTH AND BIOSECURITY  
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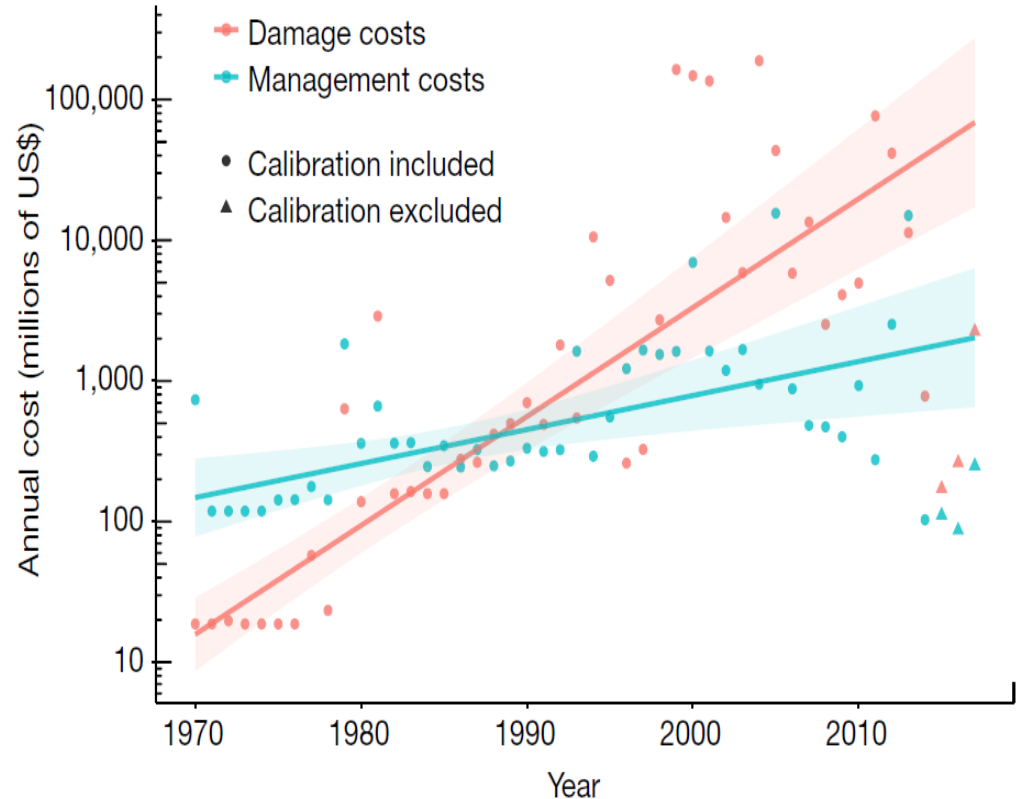
Andy Sheppard FTSE | Research Director Biosecurity



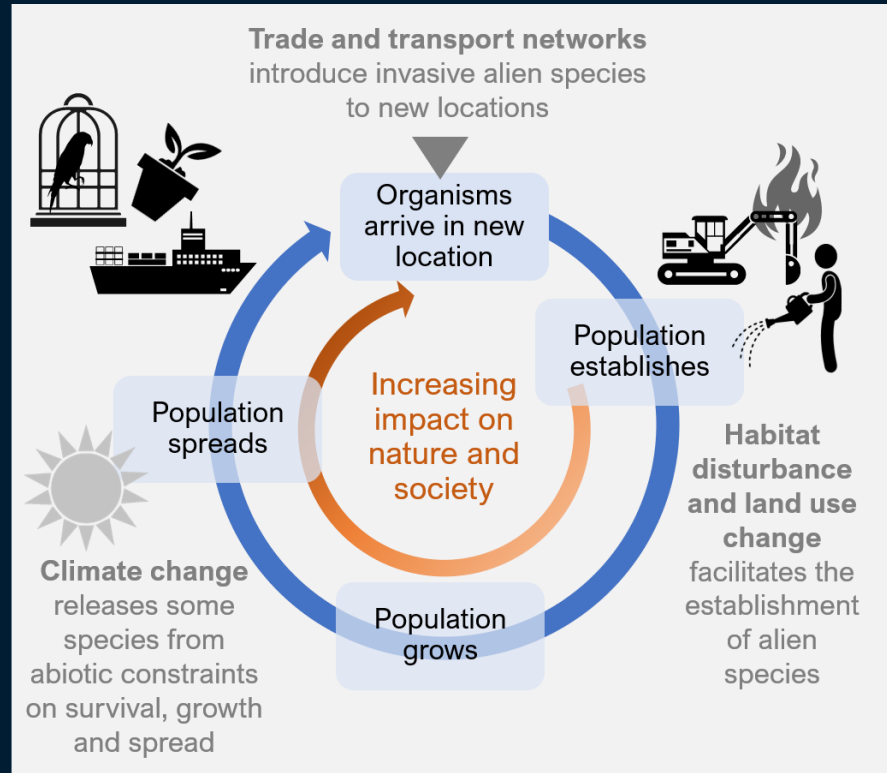
# Global Impact & management costs

Global agricultural  
trade US\$1.7  
Trillion per annum

– pests weeds &  
diseases cause  
US\$220 B per year



# Factors facilitating arrival, establishment & spread of pests, weeds & diseases



Cell Press: *One Earth* 2019 1, 171-174 DOI: (10.1016/j.oneear.2019.10.003)  
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## Key pillars of a Global “biosecurity” policy (IPPC,CBD, OIE, WHO)

1. **Regulation** of trade/import/possession/release
2. **Prevention, Preparedness & Management**
  1. **Pathway management - interception**
  2. Early Detection Rapid Response – diagnostics
  3. Eradication/management
3. **Data access/analytics**: risk assessment, response & management models, track & trace real-time analytics
4. **Communication**, public awareness, involvement of key sectors



# Hitchhiker & Contaminating pest Pathways

**41 pathways in 6 categories** : 1) release, 2) escape, 3) containment, 4) stowaway, 5) corridors, 6) unaided (Global Invasive Species Database (<http://www.iucngisd.org>))

## International pathways

- Contaminating pests - any physical trade (not just plant/animal), hull biofouling, ballast water and marine containers
- Other .... air transport, e-commerce, illegal pet/plant movements, tourism and agricultural movements

## Pathway management tools -

- Risk analysis – commodities, ships and containers\*
- Remote sensing & Earth observation \*
- Sensor & sentinel networks \*
- Rapid diagnostics – PCR/CRISPR, volatile, eDNA, acoustic & image based \*
- Track & trace – genomics \*
- Systems-based processes offshore/onshore \*

\* Can be automated supported by artificial intelligence



# International Contaminating pest management activities

1. IPPC

2. IPBES



Australian Government  
Department of Agriculture,  
Water and the Environment



INTERNATIONAL YEAR OF  
**PLANT HEALTH**  
2020

# IPPC: International symposium on limiting the spread of contaminating pests

3-4 March 2020  
Sydney, Australia





## IPPC Commission on Phytosanitary Measures #14 2019-002 Agenda item 8.10:

*“Facilitating safe trade by reducing the incidence of contaminating pests associated with traded goods”*

### Draft recommendation:

- **raise awareness** with governments and industries **of the risks and impacts of significant pests moving internationally** as contaminating pests on unregulated goods and conveyances.
- **promote the benefits** preventing traded goods, and the conveyances, containers etc that carry them within and between countries, from contamination with phytosanitary risk materials such as soil, plant material and invertebrates, in terms of **facilitating safer trade**.
- **collaborate with exporting industries** to develop commercial solutions that reduce the risk of contaminating pests moving in trade.
- **negotiate agreed actions** with importing countries **that reduce exposure** of plants and plant products to contaminating pests on trading pathways and through the movement of conveyances.
- **act on legislative powers to regulate export pathways** for the purpose of minimising the spread of contaminating pests on traded goods, conveyances, containers and other non-plant regulated articles
- **share information** with others on the mechanisms that have been developed to reduce country exposure to these risks, and expand the adoption of these solutions within and across regions with the assistance of regional bodies.





# Aims

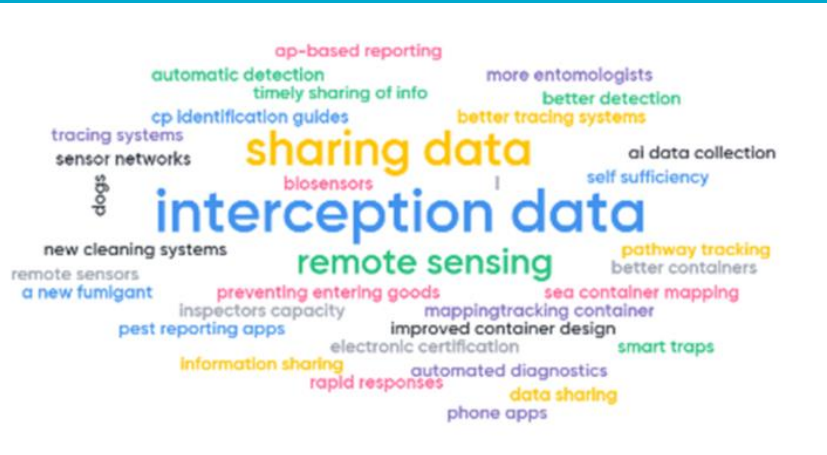
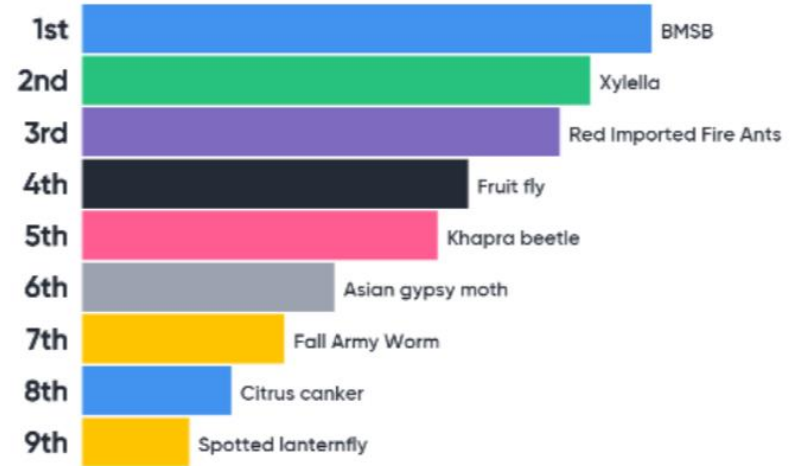
- Inform CPM draft recommendation
- Raise global awareness of risks & consequences of contaminating pests





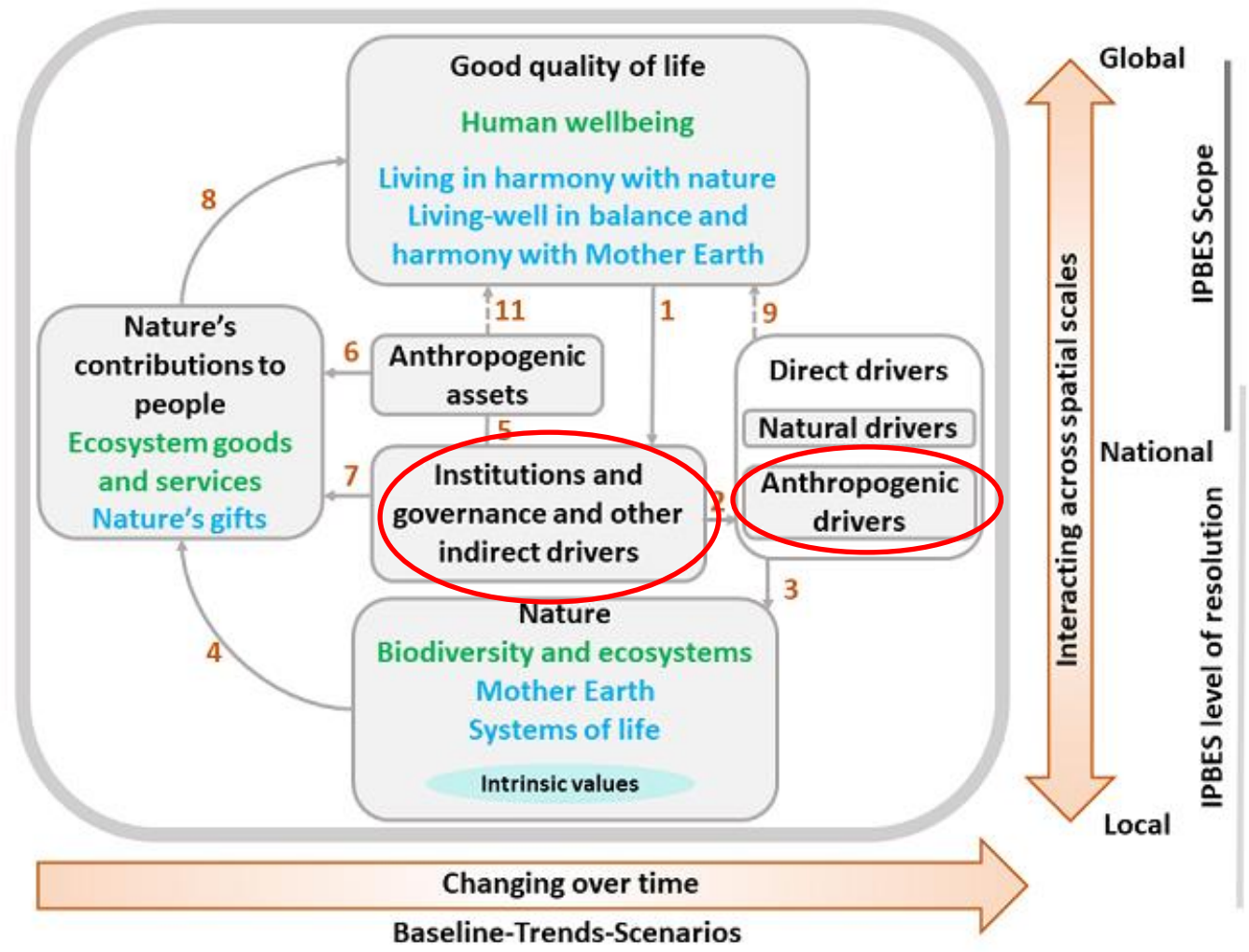
# Issues identified

- Top threats:
  - *Halyomorpha halys* (brown marmorated stink bug),  
*Xylella fastidiosa*,
  - *Solenopsis invicta* (red imported fire ant)
  - *Trogoderma granarium* (Khapra beetle)
- Need to harmonise global approach to contaminating pests
- Sharing data & analytics
- Improved container design
- Improved supply chain integrity



# ipbes

## Conceptual Framework

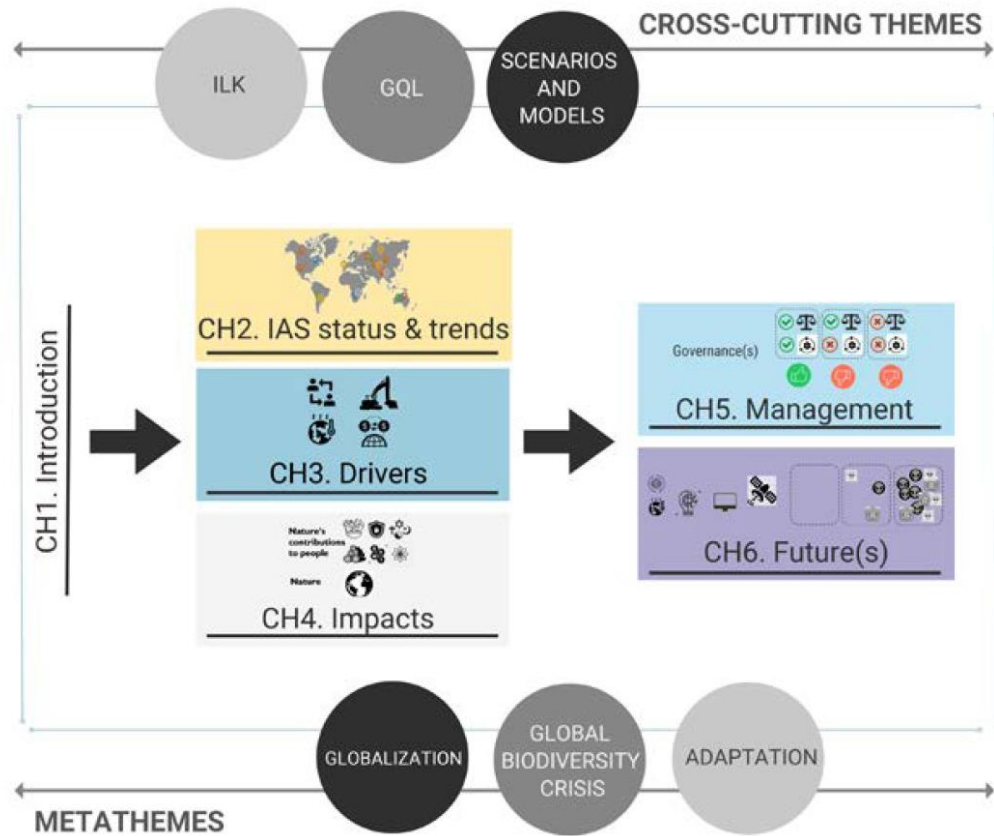




# Invasive Alien Species Assessment (due 2023)



## IAS ASSESSMENT

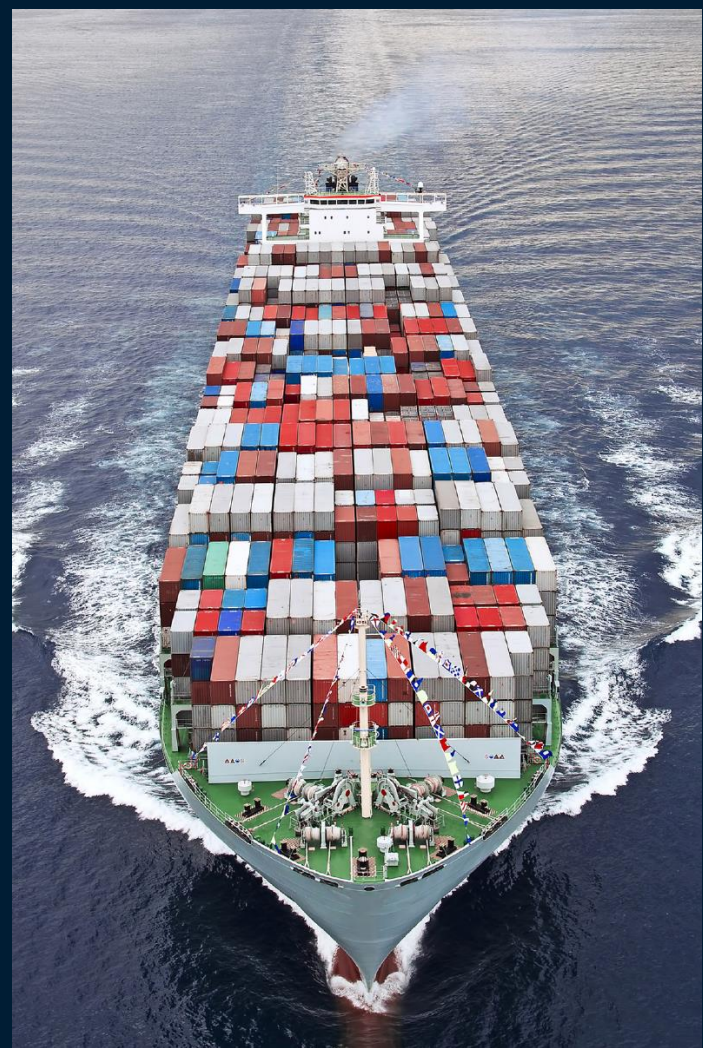
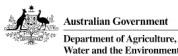






# 3 Australian contaminant management case studies

- pathway
- contaminating pest
- risk profiling ships



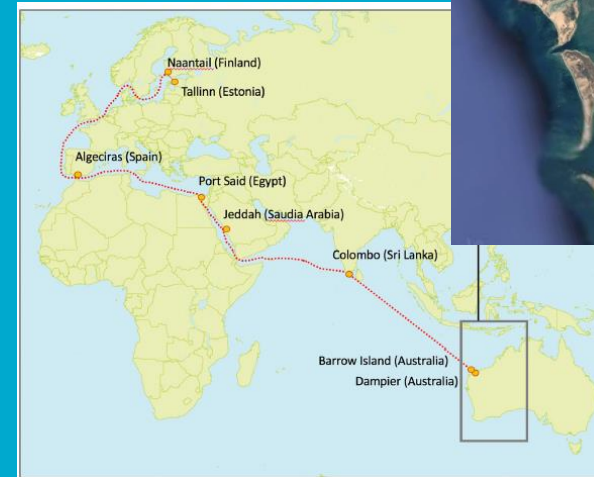
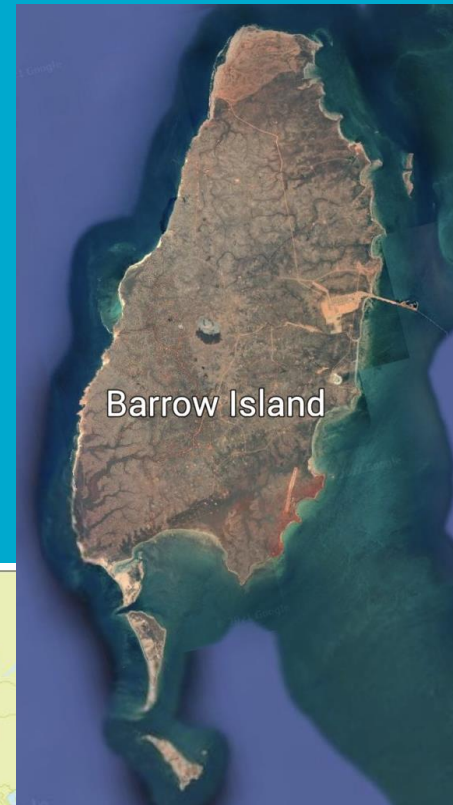


# 1) Chevron Barrow Island – Gorgon Project LNG

- Class A Australian Nature Reserve
- Demonstrate industry & environment can coexist.
- World's largest non-government quarantine management system  
- recognised global  
“best practice”
- Developed biosecure container design

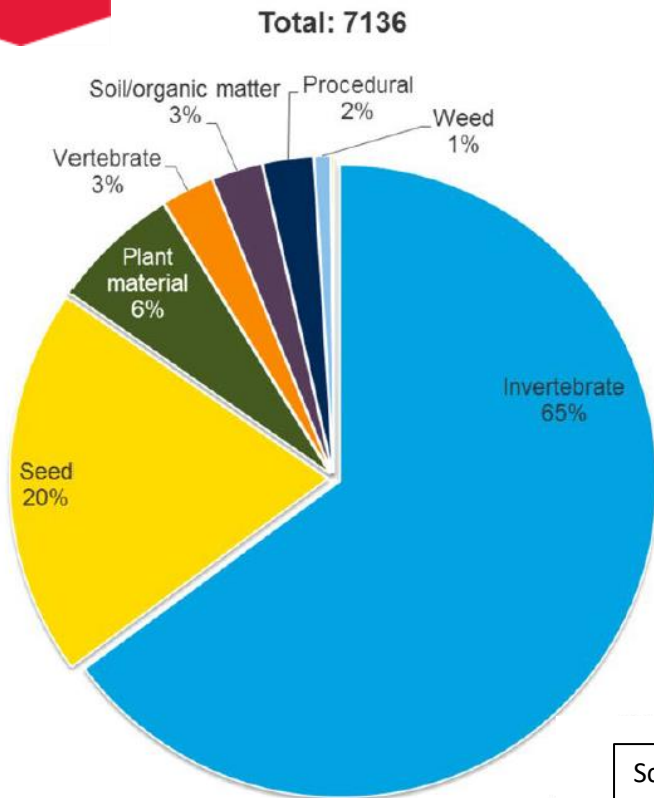


McKirdy, Simon J., et al. "Biosecurity risks posed by a large sea-going passenger vessel: challenges of terrestrial arthropod species detection and eradication." *Scientific reports* 9.1 (2019): 1-14.



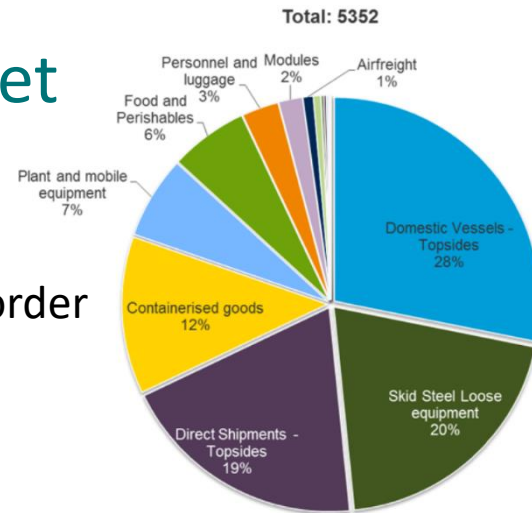


# Worlds best contaminants dataset

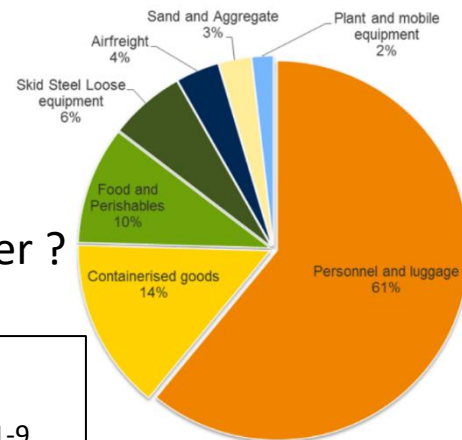


Contaminant type

Where found Pre-border ?



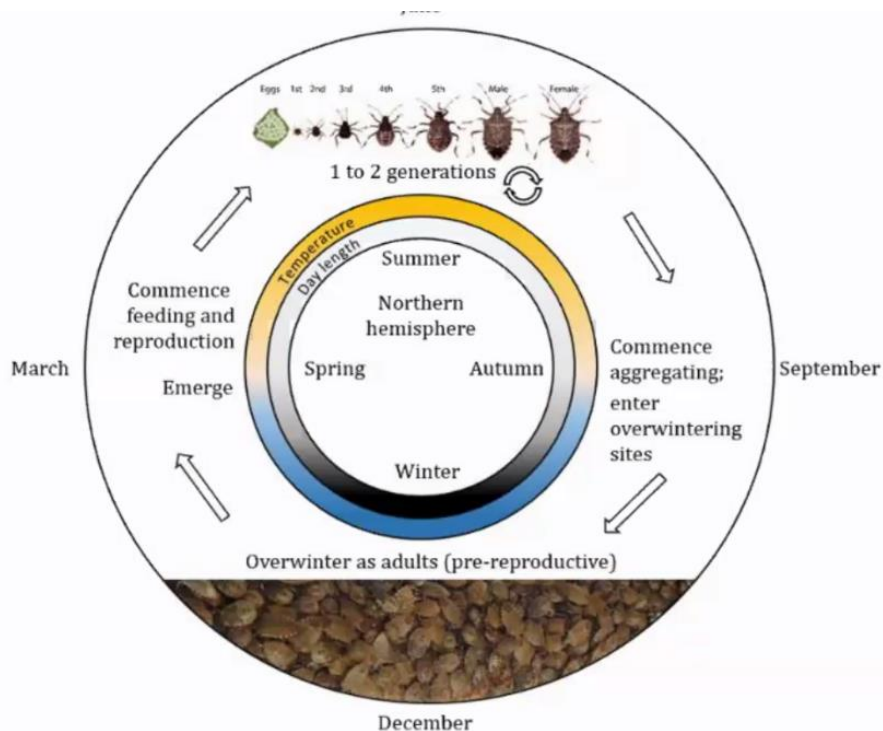
Where found Post border ?



Scott, John K., et al. "Zero-tolerance biosecurity protects high-conservation-value island nature reserve." *Nature - Scientific reports* 7.1 (2017): 1-9.



## 2) *Halyomorpha halys*



## Brown Marmorated Stink Bug (BMSB)

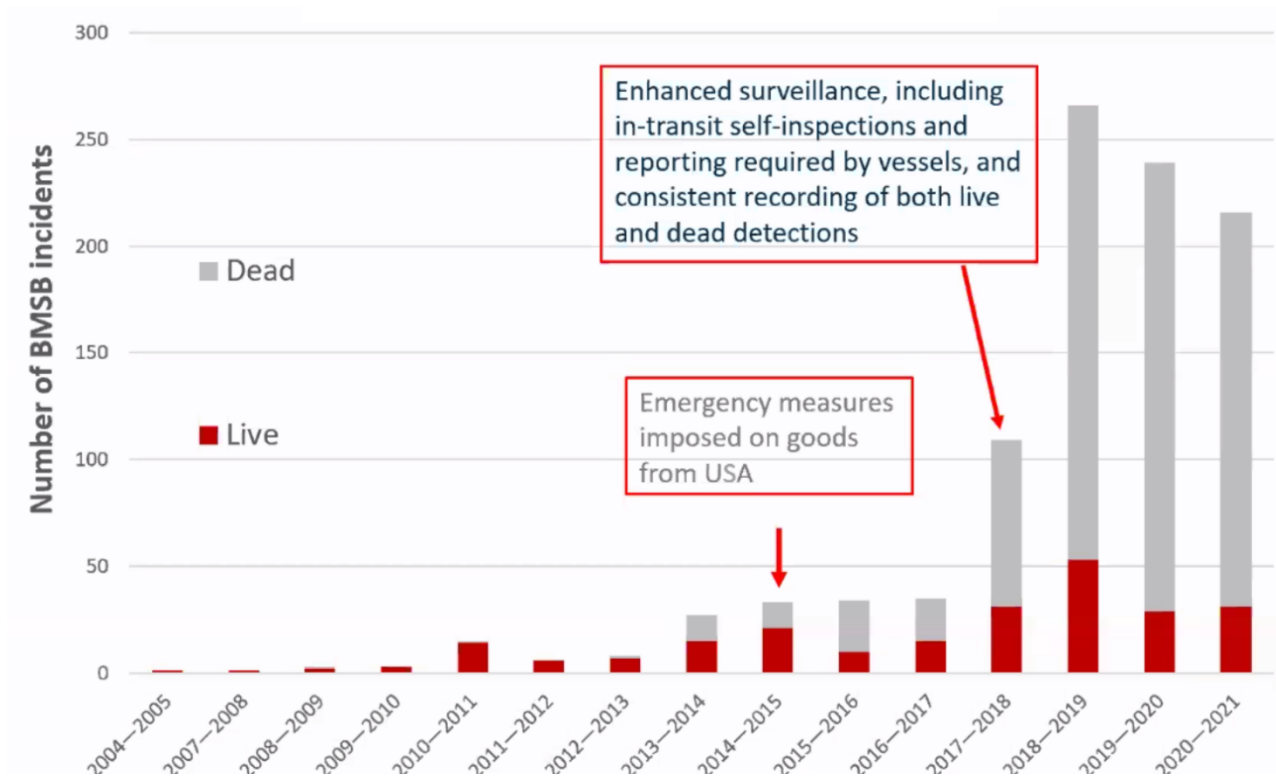
### Target risk countries





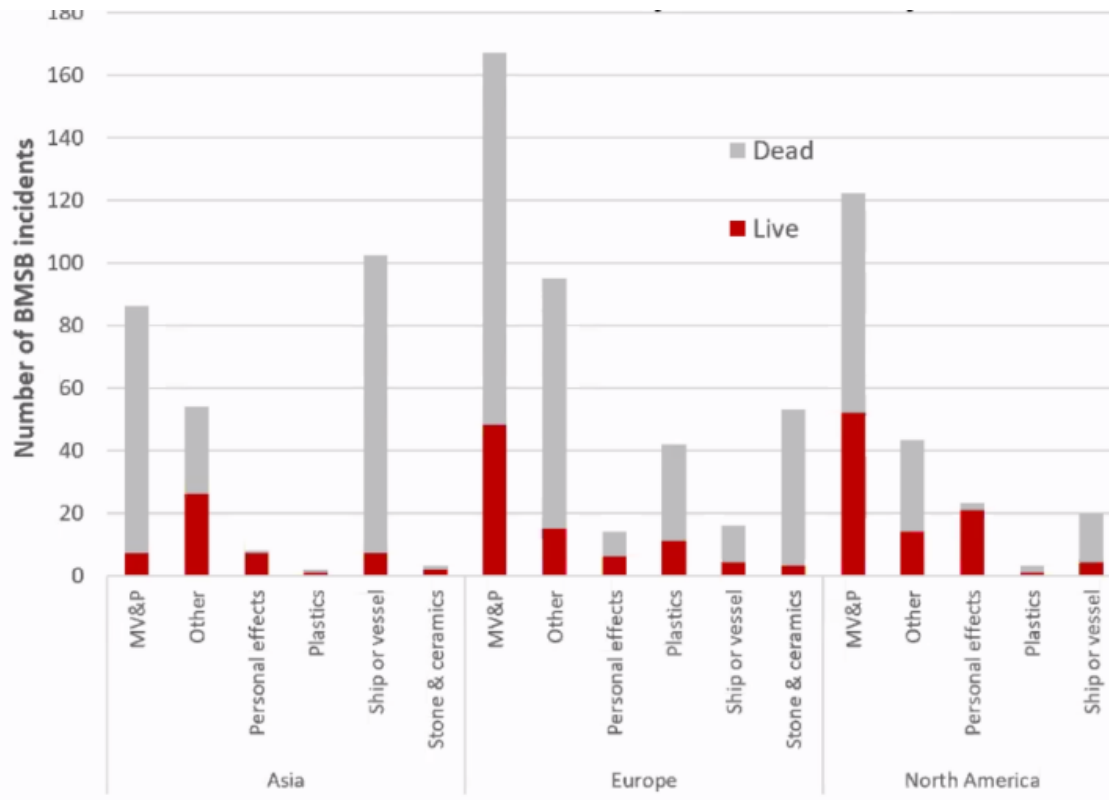


# BMSB Border Interceptions by Year





# BMSB Interception substrate



Machinery, vehicles & parts the key pathway



# Risk Management

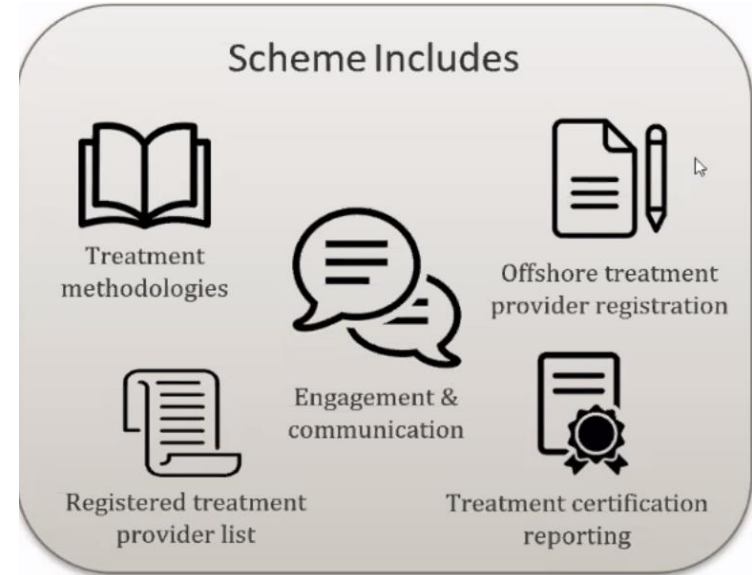
## – Systems-based process off- and onshore



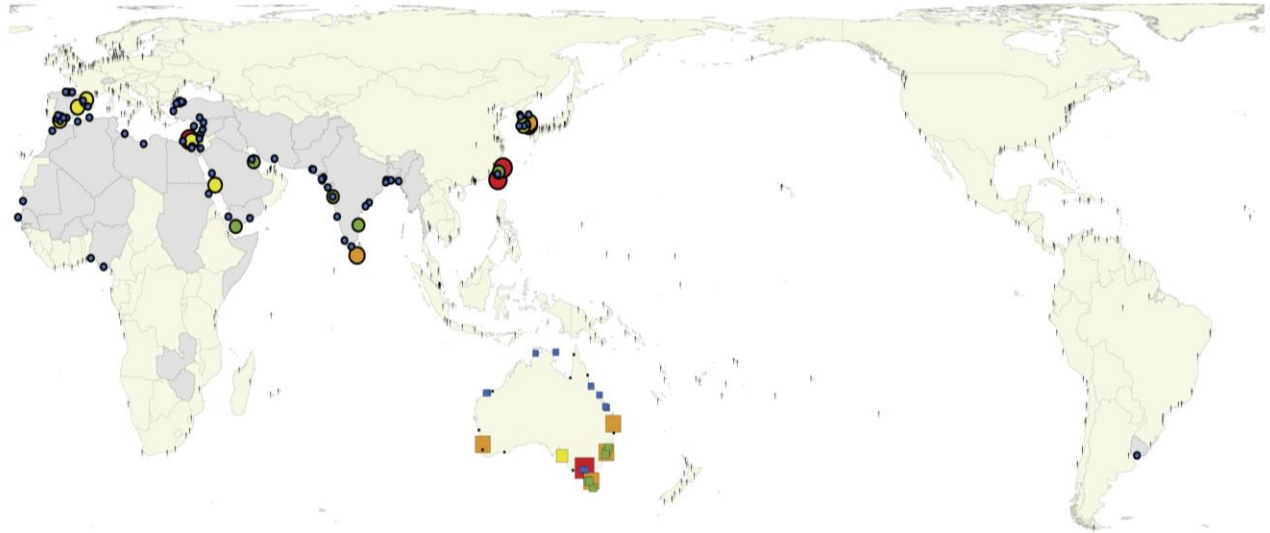
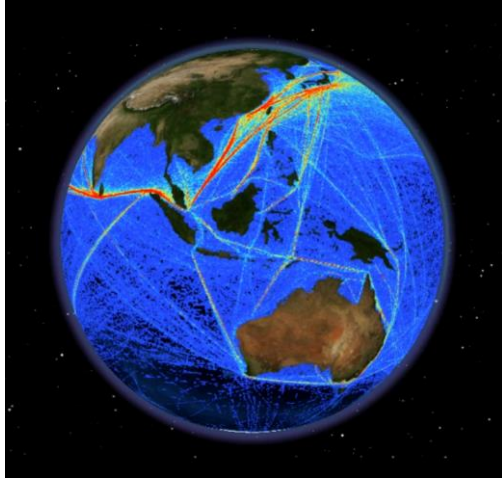
### Advantages



### Process



### 3) Risk profiling shipping for Khapra beetle (*Trogoderma granarium*) incursions into Australia



(A) Port's potential to be the source of the Khapra beetle infestations:



(B) Potential of the Khapra beetle arrival to the Australian ports:



Countries infested with the Khapra beetle

Next step - risk profiling individual containers



# Thank you

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