Risk management and Prioritisation in GB

Olaf Booy

GB Non-native Species Secretariat
The need for prioritisation
Already have lots of species

- Plants (1402)
- Insects (278)
- Other inverts (141)
- Vertebrates (50)

c. 2000
... more on the way
... more on the way

10-12 new species PA

35% since 1950
Limited resources

- 2,000 non-native species
- 300 are invasive
- Government action on 25
The need for prioritisation

- Communication of decision making
- Need for transparency

Evidence

Action
What does the strategy say?

- Key actions
What does the strategy say?

- **Key actions**
  - “Further develop the risk analysis mechanism to support strategic prioritisation of resources …”
What does the strategy say?

- **Key actions**
  - “Further develop the risk analysis mechanism to support strategic prioritisation of resources …”
  - “Use risk management to help identify and prioritise more species for rapid eradication in Great Britain”
What does the strategy say?

- **Key actions**

  - “Further develop the risk analysis mechanism to support strategic prioritisation of resources …”
  
  - “Use risk management to help identify and prioritise more species for rapid eradication in Great Britain”
  
  - “Make the link between risk assessments, risk management and policy decisions more transparent and communicate them more clearly”
Currently we have risk assessment

- 90 risk assessments signed off
- HZ exercise identifying top 30 risks
HIGH RISK

HIGH RISK
Risk analysis

- Risk Assessment
- Risk Management
- Risk Communication
Risk analysis

Risk Assessment

Risk Management

Risk Communication
Development of an RM scheme
Priorities for management in GB

Prevention

- Pathway management
- Contingency response
Priorities for management in GB

- Prevention
  - Pathway management
  - Contingency response
- Rapid response
  - Eradication
Priorities for management in GB

- Prevention
  - Pathway management
  - Contingency response

- Rapid response
  - Eradication

- Long term management
  - Reduce population
  - Contain
  - Slow spread
  - Protect key areas
Priorities for management in GB

- Prevention
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  - Reduce population
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  - Protect key areas

• Too complicated to tackle all at once
Priorities for management in GB

- **Prevention**
  - Pathway management
  - Contingency response

- **Rapid response**
  - Eradication

- **Long term management**
  - Reduce population
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• Too complicated to tackle all at once
Priorities for management in GB

- Prevention
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- Rapid response
  - Eradication
- Long term management
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  - Contain
  - Slow spread
  - Protect key areas

- Too complicated to tackle all at once
The RM scheme
# Annex 1. Template for assessing risk management (eradication) scores

Assessor name(s):

Species name:

<table>
<thead>
<tr>
<th>Title</th>
<th>Response</th>
<th>Confidence</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
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  4 - EFFECTIVE  
  3 - MODERATE  
  2 - INEFFECTIVE  
  1 - V INEFFECTIVE | 3 - HIGH  
  2 - MED  
  1 - LOW |         |
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4 – PRACTICAL  
3 – MODERATE  
2 – IMPRACTICAL  
1 - V IMPRACTICAL  | 3 – HIGH  
2 – MED  
1 – LOW  |         |
Stages within the scheme

1. **Scenario**
   - most likely situation at point of detection in the wild

2. **Eradication strategy**
   - the best strategy for total eradication (entire strategy)
Stages within the scheme

3a. Effectiveness
   - would it work if you could do it?

3b. Practicality
   - can you do it?

3c. Cost
   - how much would it cost

3d. Impact
   - negative consequences

3e. Acceptability
   - would the public / key sectors oppose
Stages within the scheme

4. Window of opportunity
   - how quickly do you need to act

5. Likelihood of reintroduction
   - following eradication
Stages within the scheme

6. Overall conclusion (feasibility of eradication)
   - taking all issues into account, how feasible is complete eradication?
Testing the scheme
Testing the scheme

- Horizon scanning (n = 25)
  - Top 30 from Roy *et al* 2014 (less 4 plant health and 1 fish health species)
Testing the scheme

- Horizon scanning \((n = 25)\)
  - Top 30 from Roy *et al* 2014 (less 4 plant health and 1 fish health species)

- Additional species established in wild with restricted range \((n = 16)\)
Expert groups

Plants • Marine • F. animals • T. animals
Plants  Marine  F. animals  T. animals

Expert groups

37 experts in total
Plants, Marine, F. animals, T. animals

Moderation of scoring

Review

Consensus

Expert groups

Consensus workshop
Consensus workshop
Consensus workshop

- Process
  - Initial presentation to clarify any definitions etc
  - Group leads presented scores
  - Breakout session
  - Final consensus across group
Plants  Marine  F. animals  T. animals

Moderation of scoring

Expert groups

Review

Consensus workshop

Consensus

List of species categorised according to overall feasibility of eradication

Final output
<table>
<thead>
<tr>
<th>Species</th>
<th>Effectiveness</th>
<th>Practicality</th>
<th>Cost</th>
<th>Impact</th>
<th>Acceptability</th>
<th>Opportunity</th>
<th>Reintroduction</th>
<th>Overall</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mnemiopsis leidyi</td>
<td>2</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>2</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Dreissena bugensis</td>
<td>2</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>2</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Echinogammarus ischnus</td>
<td>2</td>
<td>1</td>
<td>3</td>
<td>1</td>
<td>1</td>
<td>2</td>
<td>2</td>
<td>1</td>
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<tr>
<td>Echinogammarus trichiatus</td>
<td>2</td>
<td>1</td>
<td>3</td>
<td>1</td>
<td>1</td>
<td>2</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>Gracilaria vermiculophylla</td>
<td>1</td>
<td>1</td>
<td>3</td>
<td>4</td>
<td>3</td>
<td>3</td>
<td>1</td>
<td>1</td>
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<tr>
<td>Myriophyllum heterophyllum</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>2</td>
<td>1</td>
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<tr>
<td>Hemigrapsus sanguineus</td>
<td>1</td>
<td>2</td>
<td>2</td>
<td>4</td>
<td>4</td>
<td>3</td>
<td>2</td>
<td>1</td>
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<td>Hemigrapsus takanoi</td>
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<td>2</td>
<td>4</td>
<td>4</td>
<td>3</td>
<td>2</td>
<td>1</td>
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<td>Celtodoryx ciocalyptoides</td>
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<td>1</td>
<td>3</td>
<td>4</td>
<td>4</td>
<td>4</td>
<td>3</td>
<td>1</td>
</tr>
<tr>
<td>Procambarus clarkii</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>1</td>
<td>3</td>
<td>2</td>
<td>2</td>
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<td>Orconectes virilis</td>
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<td>Proterorhinus marmoratus</td>
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<td>3</td>
<td>2</td>
<td>2</td>
<td>2</td>
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<tr>
<td>Neogobius melanostomus</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>3</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
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<tr>
<td>Lysichiton americanus</td>
<td>4</td>
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<td>1</td>
<td>3</td>
<td>2</td>
<td>1</td>
<td>1</td>
<td>2</td>
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<tr>
<td>Sagittaria latifolia</td>
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<td>2</td>
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<td>5</td>
<td>4</td>
<td>4</td>
<td>3</td>
<td>2</td>
</tr>
<tr>
<td>Rapania venosa</td>
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<td>3</td>
<td>3</td>
<td>5</td>
<td>4</td>
<td>3</td>
<td>2</td>
<td>2</td>
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<tr>
<td>Linepithema humile</td>
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<td>3</td>
<td>5</td>
<td>4</td>
<td>4</td>
<td>3</td>
<td>2</td>
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<tr>
<td>Egeria densa</td>
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<td>2</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>5</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>Alnus rugosa var. glutinosa</td>
<td>4</td>
<td>3</td>
<td>2</td>
<td>4</td>
<td>3</td>
<td>4</td>
<td>1</td>
<td>2</td>
</tr>
</tbody>
</table>
Example (established species):

Quagga Mussel

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Effectiveness</td>
<td>low</td>
</tr>
<tr>
<td>Practicality</td>
<td>v. low</td>
</tr>
<tr>
<td>Cost</td>
<td>v. high</td>
</tr>
<tr>
<td>Impact</td>
<td>v. high</td>
</tr>
<tr>
<td>Acceptability</td>
<td>v. low</td>
</tr>
<tr>
<td>Window of opp.</td>
<td>high</td>
</tr>
<tr>
<td>Likelihood of reintro.</td>
<td>v. high</td>
</tr>
<tr>
<td>Overall feasibility of eradication</td>
<td>v. low</td>
</tr>
</tbody>
</table>
Example (established species):

**Aesculapian Snake**

<table>
<thead>
<tr>
<th>Category</th>
<th>Rating</th>
</tr>
</thead>
<tbody>
<tr>
<td>Effectiveness</td>
<td>v high</td>
</tr>
<tr>
<td>Practicality</td>
<td>v high</td>
</tr>
<tr>
<td>Cost</td>
<td>low</td>
</tr>
<tr>
<td>Impact</td>
<td>v low</td>
</tr>
<tr>
<td>Acceptability</td>
<td>mod</td>
</tr>
<tr>
<td>Window of opp.</td>
<td>long</td>
</tr>
<tr>
<td>Likelihood of Reintro.</td>
<td>low</td>
</tr>
<tr>
<td><strong>Overall feasibility of eradication</strong></td>
<td>v high</td>
</tr>
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</table>
### Alpine Newt

<table>
<thead>
<tr>
<th>Species</th>
<th>English</th>
<th>Taxonomic group</th>
<th>Environment</th>
<th>Establishment status</th>
<th>Effectiveness</th>
<th>Practicality</th>
<th>Cost</th>
<th>Impact</th>
<th>Acceptability</th>
<th>Window of opp.</th>
<th>Likelihood of Reintro.</th>
<th>Overall feasibility of eradication</th>
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<tr>
<td>Ichthyosaura alpestris</td>
<td>Alpine Newt</td>
<td>Amph</td>
<td>1</td>
<td>4</td>
<td>3</td>
<td>2</td>
<td>5</td>
<td>3</td>
<td>4</td>
<td>1</td>
<td>3</td>
<td>M</td>
</tr>
</tbody>
</table>

#### Example (established species):

- **Effectiveness**: high
- **Practicality**: mod
- **Cost**: high
- **Impact**: v low
- **Acceptability**: mod
- **Window of opp.**: long
- **Likelihood of Reintro.**: v high
- **Overall feasibility of eradication**: mod
Example (horizon species):

Raccoon

<p>| | |</p>
<table>
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Echinogammarus trichiatus

Example (horizon species):

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<tr>
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<tr>
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<td>short</td>
</tr>
<tr>
<td>Likelihood of Reintroduction</td>
<td>high</td>
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<tr>
<td>Overall feasibility of eradication</td>
<td>v low</td>
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</table>
Feasibility of eradication vs. environment

Overall feasibility of eradication
(1 very low - 5 very high)
Prioritisation

- Comparing risk assessment and risk management scores
OVERALL RISK MANAGEMENT SCORE
(FEASIBILITY OF ERADICATION)
OVERALL RISK MANAGEMENT SCORE
(FEASIBILITY OF ERADICATION)

a. increasing priority for eradication / contingency
OVERALL RISK MANAGEMENT SCORE
(FEASIBILITY OF ERADICATION)

b. lesser priority for eradication
OVERALL RISK MANAGEMENT SCORE
(FEASIBILITY OF ERADICATION)

V. LOW LOW MED HIGH V. HIGH

OVERAL RISK SCORE
HIGH MED LOW

c. Eradication unlikely to be feasible - priority for prevention / long term management
Contingency priorities (horizon species)

OVERALL RISK MANAGEMENT SCORE (FEASIBILITY OF ERADICATION)
Contingency priorities (horizon species)
Contingency priorities (horizon species)

OVERALL RISK MANAGEMENT SCORE
(Feasibility of eradication)

- V. LOW
- LOW
- MED
- HIGH
- V. HIGH

TOP 30
TOP 20
TOP 10

OVERALL RISK SCORE

- V. LOW
- V. HIGH
- HIGH
- MED
- LOW
- V. LOW

Contingency priorities (horizon species)
Contingency priorities (horizon species)

OVERALL RISK MANAGEMENT SCORE
(Feasibility of eradication)

- TOP 10
  - Mh
  - Ha
  - Nm
  - MI
  - Et
  - Cc
  - Gc
  - Ei

- TOP 20
  - Vv
  - Hv
  - Lh
  - Cf
  - Pm

- TOP 30
  - Ta
  - Nn
  - Np
  - Pl
  - Ml
  - Gc
  - Ei
  - Ha
  - Rv
  - Pm
  - Oi
  - Ts

OVERALL RISK SCORE
- V. LOW
- LOW
- MED
- HIGH
- V. HIGH
Eradication priorities (established species)

OVERALL RISK MANAGEMENT SCORE (FEASIBILITY OF ERADICATION)
Eradication priorities (established species)

OVERALL RISK MANAGEMENT SCORE
(FEASIBILITY OF ERADICATION)
Eradication priorities (established species)
Eradication priorities (established species)
Eradication priorities (established species)
Conclusion

- Provides a logical framework, covering the main variables associated with eradication
Conclusion

- Provides a logical framework, covering the main variables associated with eradication
- Indicates potential priorities for contingency planning and eradication
Conclusion

- Provides a logical framework, covering the main variables associated with eradication
- Indicates potential priorities for contingency planning and eradication
- Helps document the link between evidence and action
Conclusion

- Provides a logical framework, covering the main variables associated with eradication
- Indicates potential priorities for contingency planning and eradication
- Helps document the link between evidence and action
- Does not determine priorities
Conclusion

- Limitations
Conclusion

- Limitations
  - Does not cover prevention or long term management
Conclusion

- Limitations
  - Does not cover prevention or long term management
  - Indicates priorities that should be considered – further assessment likely to be required before deciding to act
Thanks!

olaf.booy@apha.gsi.gov.uk

www.nonnativespecies.org
End
Plants (1402)
Insects (278)
Vertebrates (50)
Other inverts (141)
Alien vs. Native

<table>
<thead>
<tr>
<th>Category</th>
<th>Native</th>
<th>Non-native</th>
<th>Total</th>
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<tbody>
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<td>3000</td>
<td>6000</td>
</tr>
<tr>
<td>Inverts</td>
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<td>32,500</td>
<td>65,000</td>
</tr>
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<td>Mammals</td>
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<tr>
<td>Birds</td>
<td>590</td>
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<td>1180</td>
</tr>
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</tr>
<tr>
<td>Freshwater fish</td>
<td>51</td>
<td>51</td>
<td>102</td>
</tr>
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</table>

n. =

Native
Non-native
OVERALL RISK MANAGEMENT SCORE
(FEASIBILITY OF ERADICATION)

<table>
<thead>
<tr>
<th>Priority</th>
<th>Species</th>
<th>Code</th>
</tr>
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<tbody>
<tr>
<td>Highest</td>
<td>None</td>
<td>A1</td>
</tr>
<tr>
<td>Very high</td>
<td>Zamenis longissimus</td>
<td>B1</td>
</tr>
<tr>
<td>High</td>
<td>Baccharis halimifolia</td>
<td>C1</td>
</tr>
<tr>
<td></td>
<td>Sarracenia purpurea</td>
<td>C2</td>
</tr>
<tr>
<td></td>
<td>Orconectes limosus</td>
<td>C2</td>
</tr>
<tr>
<td></td>
<td>Ichthyosaura alpestris</td>
<td>C3</td>
</tr>
<tr>
<td>Moderate</td>
<td>Lacerta bilineata</td>
<td>D1</td>
</tr>
<tr>
<td></td>
<td>Egeria densa</td>
<td>D2</td>
</tr>
<tr>
<td></td>
<td>Cabomba caroliniana</td>
<td>D2</td>
</tr>
<tr>
<td></td>
<td>Aponogeton distachyos</td>
<td>D2</td>
</tr>
<tr>
<td></td>
<td>Podarcis muralis</td>
<td>D2</td>
</tr>
<tr>
<td></td>
<td>Lysichiton americanus</td>
<td>D3</td>
</tr>
<tr>
<td></td>
<td>Procambarus clarkii</td>
<td>D3</td>
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<tr>
<td></td>
<td>Sagittaria latifolia</td>
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<tr>
<td>Low</td>
<td>Hydropotes inermis</td>
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<td></td>
<td>Alopochen aegyptiacus</td>
<td>E1</td>
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<tr>
<td></td>
<td>Orconectes virilis†</td>
<td>E2</td>
</tr>
<tr>
<td></td>
<td>Dreissena bugensis†</td>
<td>E3</td>
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<tr>
<td></td>
<td>Hemigrapsus sanguineus†</td>
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</tr>
<tr>
<td></td>
<td>Hemigrapsus takanoi†</td>
<td>E3</td>
</tr>
</tbody>
</table>

† Priorities for long term management
Requests from GB administrations, Programme Board, horizon Scanning, monitoring

**Secretariat**
- Collate
- Prioritise requests

**Secretariat**
- Identify Assessor & Commission RA

**Risk Assessor**
- RA produced

**Secretariat**
- Identify peer reviewer and initiate review

**Peer Reviewer**
- Comments

**NNRAP**
- Reviews and comments on RA; determines whether fit for purpose

**Risk Assessor**
- Responds to comments and modifies RA

**RA approved by NNRAP?**
- Yes
- No

**Secretariat**
- Summarises RA

**Programme Board**
- Adopts RA and summary

**Secretariat**
- Publishes RA and alerts stakeholders

**Stakeholders**
- Comment on evidence in RA
Using risk analysis to inform decision making

**RISK ASSESSMENT**
- Entry
- Establishment
- Spread
- Impact

**RISK SUMMARY**

**PRIORITISATION**
- Decision Makers

**RISK MANAGEMENT**
- Prevention
- Rapid Eradication
- Management

**INVASIVE SPECIES ACTION PLAN**
Testing the scheme

- Selecting species
Testing the scheme

- Selecting species
Testing the scheme

- **XX experts with relevant invasive non-native species experience**
  - e.g. fish eradication, bird and mammal management, aquatic plant management, herptile management, marine management, terrestrial plants management, freshwater invert and terrestrial invert management

- **Grouped according to expertise:**
  - Plants
  - Marine
  - Terrestrial animals
  - Freshwater animals
Using the RM scheme

- Robust scores that show the feasibility of eradication for 41 species (here and on the horizon) and the associated issues
  - Clearly documented to help communicate the rational

- Ideally need to link these scores with risk in order to give an indication of where priority may lie