Disease Risk Analysis for Freshwater Mollusks

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Freshwater Mollusk Conservation Society 2018 Workshop:
Freshwater Mollusk Health and Disease Assessment

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INTRODUCTION – HOW TO USE THIS DRA WORKSHEET

This Worksheet provides a standardised template for capturing the data generated through the application of the structured, evidence based disease risk analysis (DRA) process outlined in Jakob-Hoff et al (2014) IUCN-SSC/OIE *Manual of Procedures for Wildlife Disease Risk Analysis.*

Complexity and Uncertainty

Disease arises through the complex interaction of multiple environmental, host and disease agent factors and relevant data is often incomplete or absent resulting in a high level of uncertainty. However, wildlife populations in need of conservation management or interactions between wildlife resulting in disease risks to people and domestic animals require a timely, often rapid, response. The DRA process provides a basis for making informed risk management decisions based on the best available evidence while simultaneously identifying gaps in knowledge in a way that helps to focus and prioritize further research.

The most effective way to manage this combination of complexity and uncertainty is through trans-disciplinary collaboration. Consequently the DRA process should, ideally, involve a facilitated collaboration between key stakeholders i.e. people who have an interest, knowledge or expertise to contribute or influence the implementation of recommendations arising from the DRA. At a minimum it must involve wildlife managers and veterinarians with relevant expertise.

Situation-Specific Protocols

The Worksheet provides the flexibility to develop risk management protocols based on available information, time and resources and specific to the circumstances associated with each individual wildlife scenario. Templates for a number of analytical tools are provided to capture information and can be modified or deleted to suit needs. The results obtained from other tools such as OUTBREAK or @RISK can also be imported into the relevant section and the details of methodology included as an Appendix.

When followed diligently the IUCN/OIE DRA process provides a robust basis for assessing the likelihood and consequences of individual disease hazards to specified populations and making informed risk management decisions based on the best available evidence.

As indicated in Figure 1 this is an iterative process that recognizes that new information of relevance is continually being generated and should be incorporated into regular reviews of the DRA.

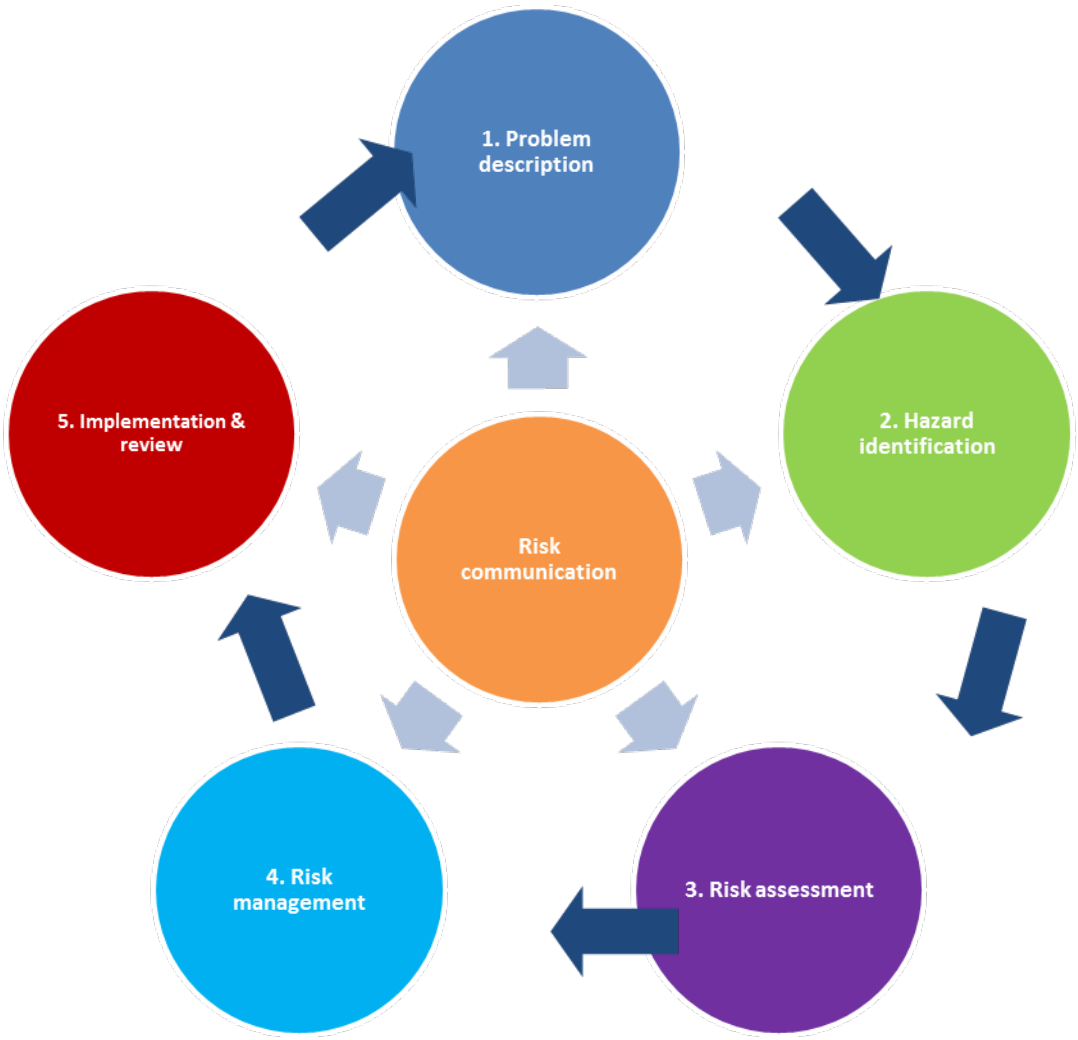
Examples

An increasing number of examples of the application of this DRA process using the Worksheet format can be found at http://www.cpsg.org/document-repository Both English and Spanish versions of the *Manual of Procedures for Wildlife Disease Risk Analysis* can also be downloaded from this site.

Central Repository

A comprehensive DRA can be time consuming and expensive. Considerable research may be involved in documenting available information on hazard lists including their geographic distribution, biological characteristics and species susceptibilities. Much of this information can be relevant to multiple wildlife disease risk scenarios. Lodging completed DRAs with the CPSG will contribute to a centralized repository accessible to anyone with internet access and can, over time, avoid duplication of effort. To this end please consider forwarding completed wildlife DRA's to office@cpsg.org

Fig 1: DRA Process Steps



Risk communication (applies throughout all DRA steps)

Purpose: Engage with a wide group of experts and stakeholders to maximise the quality of analysis and probability that recommendations arising will be implemented.

Questions: "Who has an interest in, who has knowledge of value to, and who can influence the implementation of recommendations arising from the DRA?"

1. Problem description

Purpose: Outline the background and context of the problem, identify the goal, scope and focus of the DRA, formulate the DRA question(s), state assumptions and limitations and specify the acceptable level of risk

Questions: "what is the specific question for this DRA what kind of risk analysis is needed?"

2. Hazard identification

Purpose: Identify all possible health hazards of concern and categorise into 'infectious' and 'non-infectious' hazards. Establish criteria for ranking importance of each hazard within the bounds of the defined problem. Exclude hazards with zero or negligible probability of release or exposure, and construct a scenario tree for remaining, higher priority, hazards of concern which must be more fully assessed.

Questions: "What can cause *disease* in the population of concern?" and "how can this happen?"

3. Risk assessment

***Purpose*:** To assess for each *hazard* of concern, a) the likelihood of release (introduction) into the area of concern, b) the likelihood that the species of interest will be exposed to the hazard once released, and c) the consequences of exposure. On this basis the hazards can be prioritised in descending order of importance.

***Questions*:** "What is the likelihood and what are the consequences of an identified hazard occurring within an identified pathway or event?"

4. Risk management

Purpose: Review potential risk reduction or management options and evaluate their likely outcomes. On this basis decisions and recommendations can be made to mitigate risks associated with the identified hazards.

Questions: "What can be done to decrease the likelihood of a hazardous event?" and 'What can be done to reduce the implications once a hazardous event has happened?"

5. Implementation and review

Purpose: To formulate an action and contingency plan and establish a process and timeline for monitoring, evaluation and review of risk management actions. The review may result in a clearer understanding of the problem and enable refinement of the DRA.

Questions: "How will the selected risk management options be implemented?" and, once implemented, "Are the risk management actions having the desired effect?" and, if not, "how can they be improved?"

EXECUTIVE SUMMARY

PROBLEM DESCRIPTION

Justification for this DRA

Background and Context

DRA Goal

DRA Scope

DRA Focus

DRA Question(s)

Assumptions

Limitations

Acceptable Risk

HAZARD IDENTIFICATION

Population(s) of Interest

Hazard List

Table 1: Potential Infectious Disease Hazards to Populations of Interest

Disease	***Causative Agent***	***Relevant factors*** *(eg species susceptibility, distribution, transmission, knowledge gaps etc.)*	***Reference #[1]***
VIRAL			
BACTERIAL			
FUNGAL			
INTERNAL PARASITES			
PROTOZOA			
HELMINTHS			
BLOOD PARASITES			
EXTERNAL PARASITES			

[1] As listed in the reference list at the end of this document

Table 2: Potential Non-Infectious Hazards to Populations of Interest

Non-Infectious Hazards	***Comment***	***Reference #***

Hazard Prioritization

Table 3: Hazard Prioritization

Prioritization criteria for (population of interest)	
LIKELIHOOD	
High	
Medium	
Low	
Negligible	
CONSEQUENCE	
High	
Medium	
Low	
Negligible	

Table 4: Risk Prioritization Matrix for (insert population of interest)

		Consequence to Population			
		High (3)	Medium (2)	Low (1)	Negligible (0)
Likelihood	High (3)				
	Medium (2)				
	Low (1)				
	Negligible (0)				

Rational for Hazard Risk Prioritization in Table 4

Hazard	***Likelihood x Consequence***	***Rationale***

Add further matrices for each population of interest (if some populations are grouped (eg similar disease susceptibilities, hazard exposure pathways etc include a note to explain the basis of this grouping).

Paired Ranking *(Miller & Jakob-Hoff 2014)*

- This process can be applied in the event that the preceding identifies sufficient high priority diseases[2] that further prioritization between them would be helpful. The paired ranking process requires participants to use their knowledge of the hazards to compare the potential impact of each with each other hazard, listing them in order of highest to lowest impact considering the following questions:
    - *Which hazards should be subjected to a detailed risk assessment in the workshop (balancing value of expertise in the room, time available and priority for the workshop goal)?*
    - *Which additional hazards require detailed risk assessment post-workshop (selections based on the likely contribution of such risk analyses to the informed decision for which this DRA has been instigated)?*

[2] Where 'high priority' could be all non-negligible hazards or a subset of hazards such as those scoring above a specified consequence x likelihood score.

Paired Ranking for Prioritization of Disease Hazards for the (focal species)

Table 5: Insert Population of Interest:

Hazard	***Score***	***Rank***

Table 6: Hazards selected for detailed risk assessment

Hazard	***Rank***

Translocation Pathway (if appropriate to this DRA)

Figure 1:

Hazard Transmission Pathway(s) and Critical Control Points (CCPs)

Figure 2:

RISK ASSESSMENTS

Risk Assessment for (add name of disease hazard)

Conducted by: (add names of contributors to this risk assessment)

(**Note**: results of analyses using any quantitative of qualitative risk assessment tools can be imported here and the details of the analysis attached as an appendix).

Justification for hazard status

Release assessment

Exposure assessment

Consequence assessment

Risk estimation

Based on the above and (any other considerations), the overall risk of this hazard to (population(s) of interest) is ranked as (**HIGH/MEDIUM/LOW/NEGLIGIBLE**) and risk mitigation actions are/are not recommended.

Level of Confidence in this Risk Estimation

(Rank High, Medium or Low and explain the basis of this ranking)

Knowledge Gaps and Research Plan

Table 7: Knowledge gaps and measures to reduce uncertainty in this risk assessment

Knowledge Gap	***Measures needed to reduce uncertainty***	***Research Priority***

RISK MANAGEMENT

DISEASE HAZARD:

Predisposing Factors

Table 8: Environment, Agent and Host Factors for (Disease Hazard)

(Refer to figure on Transmission Pathways and CCPs)

Environment Factors influencing transmission	***Agent Factors influencing negative consequences to host***	***Host Factors influencing susceptibility to disease***

Diagnosis, Treatment, Control and Prevention

Diagnosis

Treatment

Control

Prevention

Risk Management Option Evaluation

Table 9: Risk management option evaluation for (Disease Hazard) to (Population of Interest)

(Refer to figure on Transmission Pathways and CCPs)

CCP#	*Mitigation Options*	*Effectiveness*	*Feasibility*	*Explanation (include any relevant sources of information)*	*Recommendation (Y/N)*

IMPLEMENTATION AND REVIEW

Risk Management Action Plan

Table 10: Risk Mitigation Action Plan for (Hazard) to (Population of Interest)

(Example provided relates to management of risk of exposure of Eastern Barred Bandicoots to Toxoplasma gondii at two sites in Victoria, Australia)

Management Target	***Goals***	***Actions***	***Frequency***	***Responsibility***	***Success measure(s)***	***Data required***
Feral domestic cats on Phillip Island and French Island	*Reduced environmental contamination with oocysts*	*Integrated cat eradication program informed by target density that will achieve goal*	*Ongoing*	*Parks Victoria/Phillip Island Nature Parks/French Island Landcare*	*Target density met and maintained*	*Program monitoring data*

RISK COMMUNICATION

Draft Risk Communications Plan developed by (names of contributors)

Communication Plan Objectives

Stakeholders and Stakeholder Groups Relevant to this Project

Communication Risks and Risk Mitigation Plan

REFERENCES

APPENDICES

Appendix (add number and title)