



Australian Government
Department of Agriculture,
Water and the Environment

Import of live sturgeon for aquaculture

Issues Paper

21 June 2022



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Department of Agriculture, Water and the Environment
GPO Box 858 Canberra ACT 2601
Telephone 1800 900 090
Web agriculture.gov.au

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Stakeholder submissions on Issues Papers and draft reports

This Issues Paper allows interested parties to comment on relevant technical biosecurity issues. Draft and final reports will consider any comments received.

Submissions should be sent to the Department of Agriculture, Water and the Environment and must meet the conditions specified in the relevant [Biosecurity advice notice](#).

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Acronyms and abbreviations

| Term or abbreviation | Definition |
|-----------------------------|---|
| AA | Approved arrangement |
| ALOP | Appropriate level of protection |
| BA | Biosecurity Advice |
| BICON | Australia's Biosecurity Import Condition System |
| CA | Competent Authority |
| CITES | Convention on International Trade in Endangered Species of Wild Fauna and Flora |
| EU | European Union |
| IUCN | International Union for Conservation of Nature |
| OIE | World Organisation for Animal Health |
| OIE Code | OIE Aquatic Animal Health Code |
| OIE Manual | OIE Manual of Diagnostic Tests and Vaccines for Aquatic Animals |
| PEQ | pre-export quarantine |
| PAQ | Post-arrival quarantine |
| RAS | Re-circulating Aquaculture System |
| SPS Agreement | WTO agreement on the Application of Sanitary and Phytosanitary Measures |
| WTO | World Trade Organization |

Summary

The Australian Government Department of Agriculture, Water and the Environment (the department) has prepared this Issues Paper to begin the biosecurity risk assessment of the proposal to import live beluga (*Huso huso*) and Siberian sturgeon (*Acipenser baerii*) for aquaculture purposes into Australia from approved countries.

This Issues Paper considers relevant peer-reviewed scientific information, advice from international scientific experts, standard industry practices and operational practicalities.

Australia does not currently permit the import of any live sturgeon species for commercial purposes.

This Issues Paper is a required step under the [Biosecurity Regulation 2016](#) and is the first major technical consultation in the formal biosecurity import risk analysis (BIRA) process. It contains the following sections:

- an overview of Australia's biosecurity policy framework
- background information on the proposal to import live sturgeon for aquaculture purposes
- an outline of the methods used for identifying and retaining hazards as well as the results of the preliminary hazard identification
- a brief summary of the next steps in the BIRA process, including further opportunities for consultation.

The hazard identification in this Issues Paper considered 65 disease agents, including viruses, bacteria, fungi/oomycete and protozoan parasites as potential hazards. Of the 65 disease agents, 11 are proposed as hazards that will be retained for risk assessment.

The hazards proposed to be retained for risk assessment are:

- *Aeromonas salmonicida* (typical strain)
- Acipenserid herpes virus 1 and 2 (sturgeon alloherpesviruses)
- *Argulus coregoni* and *Argulus foliaceus*
- Carp springviraemia virus (spring viraemia of carp virus)
- Cyprinid herpesvirus 3 (koi herpesvirus)
- *Ergasilus sieboldi*
- Frog virus 3
- *Polypodium hydriforme*
- Salmonid novirhabdovirus (infectious haematopoietic necrosis virus)
- Sturgeon nucleocytoplasmic large DNA viruses (White sturgeon iridovirus, Missouri River sturgeon iridovirus, Namao virus, shortnose sturgeon virus, Russian sturgeon iridovirus, British Columbia white sturgeon virus)
- *Yersinia ruckeri* (Hagerman strain).

Following the risk analysis process, as outlined in the [BIRA Guidelines 2016](#), some, none or all these hazards may require biosecurity measures to manage risks to a very low level in order to achieve Australia's appropriate level of protection.

The department invites interested parties to provide comments and submissions about the issues contained in this paper (or others not identified) within the consultation period. Further details on making a submission are outlined in Chapter 4.

1 Introduction

1.1 Australia's biosecurity policy framework

Australia's biosecurity system consists of three focus areas for preventing or responding to the incursion of pests and diseases: overseas; at our border and within Australia. Across these three focus areas, the Australian Government Department of Agriculture, Water and the Environment (the department) undertakes a range of policy, operational and compliance functions and implements various education, awareness and communication campaigns.

Biosecurity risk cannot be reduced to zero at our border. The success of the national biosecurity system in protecting Australia's environment, economy and way of life relies on the efforts of all parties and is a shared responsibility. The department works across the Commonwealth and with governments, industry, research institutions and community groups to implement improvements across the system to manage biosecurity risk efficiently and effectively.

The risk analysis process is an important part of Australia's biosecurity policies. It enables the Australian Government to formally consider the level of biosecurity risk that may be associated with proposals to import goods into Australia. If the biosecurity risks do not achieve the appropriate level of protection (ALOP) for Australia, risk management measures are proposed to reduce the risks to an acceptable level. If the risks cannot be reduced to an acceptable level, the goods will not be imported into Australia, until suitable measures are identified.

Successive Australian Governments have maintained a conservative approach to the management of biosecurity risks. This approach is expressed in terms of Australia's ALOP, which reflects community expectations through government policy and is currently described as providing a high level of protection aimed at reducing risk to a very low level, but not to zero.

Australia's risk analyses are undertaken by the department using technical and scientific experts in relevant fields and involve opportunities for consultation with stakeholders at various stages during the process.

Risk analyses may take the form of a biosecurity import risk analysis (BIRA) or a non-regulated risk analysis (such as scientific review of existing policy and import conditions, or scientific advice). The risk analysis on the import of live sturgeon for aquaculture purposes will be conducted as a BIRA.

Further information about Australia's biosecurity framework is provided in the Biosecurity Import Risk Analysis Guidelines 2016 located on the [Australian Government Department of Agriculture, Water and the Environment](#) website.

1.2 The biosecurity import risk analysis framework

A BIRA is a science-based assessment of the biosecurity risks associated with the import of a particular good, which is provided for under law. Under the [Biosecurity Act 2015](#), a BIRA must be conducted in accordance with the process prescribed in the [Biosecurity Regulation 2016](#) (see section 1.3) and take into account the matters set out in the [BIRA Guidelines 2016](#).

The BIRA process will assess whether the import of a product with no risk management measures applied (the unrestricted risk) poses an unacceptable biosecurity risk, and if so, will recommend risk management measures to manage the risks to a level that achieves Australia's

ALOP. The import of live sturgeon or their eggs cannot occur until suitable import conditions have been developed. These import conditions will be included on an import permit issued by the department under the [Biosecurity Act 2015](#).

This Issues Paper is the start of the formal BIRA process.

1.3 Regulated steps in the biosecurity import risk analysis process

Under the [Biosecurity Regulation 2016](#), the following steps must be undertaken when conducting a BIRA:

- 1) The Director of Biosecurity must appoint a scientific advisory group.
- 2) The Director of Biosecurity must publish a notice on the department's website stating:
 - a) That a BIRA is commencing.
 - b) The opportunities for consultation that will occur during the BIRA process.
- 3) The Director of Biosecurity must prepare an Issues Paper and publish it on the department's website. The Issues Paper will set out background information about the request, the commodity/goods and some of the main matters that will be considered during the analysis.
- 4) The Director of Biosecurity must:
 - a) Prepare a draft BIRA report.
 - b) Publish on the department's website the draft report and an invitation to the public to provide submissions about the assessment of the level of biosecurity risk associated with the relevant goods or class of goods including proposed risk management measures for the goods to achieve ALOP within a period specified in the invitation.
 - c) The consultation period must be at least 60 calendar days, including the day the invitation is published.
 - d) If the Director of Biosecurity considers that the public may not have a reasonable opportunity to consider the draft BIRA report, the period for public submissions may be extended only once for a period of up to 60 calendar days.
- 5) The Director of Biosecurity must prepare a provisional BIRA report and publish it on the department's website.
- 6) Within 30 calendar days of the provisional BIRA report's publication, a person may make a request to the Inspector-General of Biosecurity to review the process used to conduct the BIRA.
- 7) If a person requests a review of the process for conducting the BIRA, and the Inspector-General is satisfied that a review can proceed, the Inspector-General must tell the Director of Biosecurity, in writing, about the request. The Inspector-General must then conduct a review of the process for conducting the BIRA.
- 8) If the Inspector-General conducts a review of the process for conducting the BIRA, the Director of Biosecurity must consider any recommendations in their report and must publish a final BIRA review report.
- 9) If the Inspector-General is not requested to conduct a review of the process for conducting the BIRA, the Director of Biosecurity must publish the provisional BIRA report as the final BIRA report as soon as is practical to do so.

The final BIRA report must be published within 30 months from the day the notice announcing the BIRA was published, unless specific circumstances apply.

The Director of Biosecurity may publish a notice on the department's website to stop the counting of time for a BIRA if:

- the Director of Biosecurity is waiting for requested further information, research or expert advice, or
- the Director of Biosecurity is waiting for examination by the scientific advisory group of a requested part of the BIRA process.

If the Inspector-General reviews the process for conducting the BIRA, the time taken for the review does not count towards the 30-month time frame.

The 30-month time frame also may not be met if a biosecurity circumstance of national or international significance occurs.

Publication of the final BIRA report represents the end of the process. The risk management measures recommended in the final report will be the basis of any import conditions in import permits issued and they inform the development of negotiated health certification to be issued by an exporting country.

Step 1 of the BIRA process, the appointment of the [scientific advisory group](#), was completed on the 14 November 2019. A Notice of Intention announcing the commencement of the sturgeon BIRA was published on the department's website on 21 June 2022, completing step 2 of the BIRA process. The publication of this Issues Paper represents the completion of step 3.

1.4 Proposed importation of live sturgeon

1.4.1 Background

In 2015, the then Australian Government Department of the Environment and Energy, included Siberian sturgeon (*Acipenser baerii*) and beluga sturgeon (*Huso huso*) to the list of specimens taken to be suitable for live import (live import list) under the [Environment Protection and Biodiversity Conservation Act 1999](#) (EPBC Act). The amendment of the live import list to include Siberian and beluga sturgeon is available at the [Federal Register of Legislation](#). Further information on the environmental assessment process to amend the live import list can be found at the department's [website](#).

Under the EPBC Act, importation of these species requires an import permit issued, by the now, Department of the Agriculture, Water and the Environment, and is only permitted for commercial aquaculture in a secure recirculation aquaculture system (RAS) to manage the risk of sturgeon establishing as a pest species in the wild.

Before these species of live sturgeon can be imported into Australia, the department must also conduct a BIRA to ensure the import meets Australia's ALOP. In 2016, the department intended to start the BIRA process, but this was delayed due to a divergence of resources to manage the response to an outbreak of white spot disease in prawns in Australia.

1.4.2 Scope

The scope of this BIRA is to consider the biosecurity risk that may be associated with the unrestricted importation of live adult and juvenile sturgeon, or their eggs from all countries for aquaculture purposes.

Siberian sturgeon (*A. baerii*) and Beluga sturgeon (*H. huso*) are the only species approved for import into Australia under the EPBC Act. Therefore, these two species will be considered for import under the BIRA.

The BIRA will consider that the imported sturgeon will be cultured in land-based semi-open aquaculture systems (i.e. flow through earthen pond systems), as they represent the highest biosecurity risk. Semi-open systems include any land-based aquaculture system where water is exchanged between the farm and a natural waterway such as flow through raceways and earthen pond systems.

The BIRA will not restrict its scope to secure RAS as required by the EPBC Act. This is because it does not exclude the scenario where the imported sturgeon may be cultured with other species of finfish in the same recirculating aquaculture facility, which can then be translocated to less secure semi-open systems depending on the aquaculture license conditions. The BIRA will consider the biosecurity risk for such a scenario.

1.4.3 Existing policy

Australian policy

Import policy does not currently exist for the importation of live adult and juvenile sturgeon, or their eggs for aquaculture purposes.

Import policy exists for live freshwater and marine ornamental finfish from approved countries. The [import requirements](#) for these commodities can be found on import conditions database (BICON) or on the department's website (agriculture.gov.au).

The department has considered the disease agents previously identified in the existing live freshwater ornamental finfish policies and where relevant, the information in those risk assessments will be considered in this BIRA.

Domestic arrangements

The Australian Government is responsible for regulating the movement of animals and animal products into and out of Australia. However, the state and territory government authorities are responsible for animal health and environmental controls within their individual jurisdictions. Once animals and animal products have been cleared for import at the Australian border by department biosecurity officers, legislation relating to fisheries resource management or animal health may be used by state and territory government authorities to control intra and interstate movement of animals and their products.

The listing or classification of a species as 'noxious', 'controlled' or 'exotic' allows a state or territory to apply regulations to control the use and potential spread of that animal. The following states and territories currently have beluga and Siberian sturgeon listed (or classified) as 'noxious', 'controlled' or 'exotic' under their respective legislation:

- Western Australia (listed as 'noxious' under the Fish Resources Management Regulations 1995)

- Queensland (listed as ‘prohibited noxious’ under the *Biosecurity Act 2014*)
- New South Wales (listed as ‘Class 1 noxious’ under the *Fisheries Management Act 1994*)
- Tasmania (declared as ‘controlled’ under the *Inland Fisheries Act 1995*)
- Northern Territory (listed as ‘noxious’ under the Fisheries Regulation 2016)
- South Australia (classified as ‘exotic’ under the *Fisheries Management Act 2007*)
- Victoria (listed as ‘noxious’ under the *Fisheries Act 1995*).

The Australian Capital Territory has not listed beluga and Siberian sturgeon as ‘noxious’, ‘controlled’ or ‘exotic’ under their legislation. Western Australia and Victoria have provisions under their legislation for permits to be issued to allow listed noxious species to be kept in some circumstances. As beluga and Siberian sturgeon are classified as exotic in South Australia, they may be held by a person but cannot be released, deposited or permitted to escape into any waters.

All state and territories have legislative controls on aquaculture production, including the rearing of fish in secure farming systems, such as RAS systems. Aquaculture operations are required to be licensed and approval must be obtained from state and territory government authorities on various management practices including water and waste disposal methods and the control of fish escapes. Licensed aquaculturists must also have approved disease control programs and must report significant disease events.

It is the importer and the licensed aquaculture facilities responsibility to identify and ensure compliance with all state and territory requirements.

1.4.4 Previous consultation

On 16 August 2016, the department sent letters to key domestic stakeholders that had expressed interest in importation of live sturgeon to Australia. The letter informed stakeholders of a forthcoming BIRA process and requested information regarding the scope of their proposed imports, such as the intended export countries and types of commodities (for example, eggs, fingerlings or sexually mature fish). The department received 10 submissions from stakeholders.

On 18 November 2016, the department sent letters to the appropriate competent authority (CA) of the countries identified as being potential sources of live sturgeon or their eggs. The letters requested the countries confirm their intent to seek market access for live sturgeon and cooperation to establish trade. Positive responses were received from 3 countries.

On 16 June 2017, the department sent letters to key stakeholders advising them that the department had delayed the commencement of the BIRA due to the divergence of resources to manage the response to an outbreak of white spot disease in prawns in Australia.

On 21 June 2022, Animal Biosecurity Advice 2022/A03 announced the department’s intent to conduct a BIRA and the release of this Issues Paper. Stakeholders are invited to provide comment or information on the issues raised in this Issues Paper during a 60-day consultation period, which will close on 22 August 2022.

1.5 Background to sturgeon aquaculture and health

1.5.1 Sturgeon aquaculture

The Acipenseriformes (sturgeon and paddlefish) are native to the Northern Hemisphere – around half of these species live in Europe, mostly in the Ponto-Caspian region, one third in North America, and the rest in East Asia and Siberia (Billard and Lecointre 2001). The family of sturgeon, *Acipenseridae*, includes four genera containing 25 species; 17 belong to the genus *Acipenser* (sturgeon), 2 to the genus *Huso* (giant sturgeon), 3 to the genus *Scaphirhynchus* (shovel-nosed sturgeon) and 3 to the genus *Pseudoscaphirhynchus* (Aral shovel-noses) (FishBase, 2021).

In natural populations, sturgeon reproduce in freshwater and then most species migrate to the sea, either living in brackish water (Caspian, Azov, Black and Baltic Seas) or in full seawater on the oceanic continental shelf, although some populations have remained entirely freshwater (Billard and Lecointre 2001). Sturgeon generally have a long life cycle, with puberty usually occurring later in life (5–30 years of age). Adult males and females do not spawn on an annual basis (Chebanov and Galich 2013).

Globally there has been a long history of commercial fisheries of sturgeon, primarily for caviar products but also as food fish. Due to over-exploitation of both natural and enhanced sturgeon stocks for caviar production, along with serious habitat deterioration, there has been a drastic decline in natural populations. In 1997, the International Union for Conservation of Nature (IUCN) listed all commercially utilised sturgeon species world-wide in Appendix II of the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) regulations (Bronzi et al. 2011). Appendix II includes species not necessarily threatened with extinction but in which trade must be controlled to avoid use incompatible with their survival. To protect wild stocks there are internationally agreed quotas for trade in sturgeon products.

This has led to a substantial development in the aquaculture of sturgeon, to re-stock depleted wild populations, and to satisfy market demand for caviar and food products. However, several sturgeon production systems continue to rely on sourcing fish from the wild to be used as broodstock (Chebanov & Galich 2013). The most utilised species is Siberian sturgeon (*A. baerii*) which is cultured in 22 countries, followed by Russian sturgeon (*Acipenser gueldensteadii*) in about 16 countries, while sterlet sturgeon (*Acipenser ruthenus*) is produced in 15 countries, and stellate sturgeon (*Acipenser stellatus*) is cultured in 12 countries (Bronzi et al. 2011). All these species are farmed in more than 30 countries, including some outside of their natural range (for example, South America).

Sturgeon are farmed in different types of freshwater systems. These systems utilise surface water, well water (including geothermal), and industrial wastewaters (including thermal effluents). It is noteworthy that even species that spend some of their life in marine environments (for example, Adriatic sturgeon and White sturgeon) are able to be reared completely in freshwater (Williot et al. 2001). On-growing of sturgeon is performed either in raceways or tanks with flowing water, in re-circulating systems or in ponds.

1.5.2 Overview of sturgeon health

Many studies have shown that sturgeon diseases often involve disease agents that remain poorly characterised (Radosavljević et al. 2019). However, intensive culture exposes the sturgeon to several sources of stress, such as high stocking densities and various manipulations that can

predispose animals to several infectious diseases associated with viral or bacterial disease agents (Georgiadis et al. 2000).

Aquaculture establishments throughout the European Union (EU), Northern America and Asia, where sturgeon are cultured are typically required to be registered with a CA. Usually, part of the registration process requires a documented health monitoring program supervised by the CA. This oversight also requires establishments to report any unusual mortality, or suspicion of disease, for further investigation. Due to the length of time to maturity (up to 12 years in some species) and value of sturgeon products, there is also an industry incentive to maintain a high health status of cultured sturgeon populations. However, Axén et al. (2018) notes that none of the primary viral infections of sturgeon is regulated by the World Organisation for Animal Health (the OIE) or EU legislation, and therefore, there is a lack of regular screening for these diseases. This has resulted in poorly implemented translocation controls and contributed to the spread of pathogens through sub clinically infected animals.

While the most common viral diseases of sturgeon tend to only infect sturgeon species, sturgeon can carry and transmit other disease agents that could affect Australia's domestic aquaculture industry and wildlife if successfully transferred. Some of these disease agents could also have an impact on export market access for a range of commodities, even if only reported from a single aquaculture facility.

2 Import risk analysis methodology

The World Organisation for Animal Health (OIE), in its Aquatic animal health code (the OIE Code), describes the components of risk analysis in Chapter 2.1. The components of risk analysis are:

- hazard identification
- risk assessment (entry assessment, exposure assessment, consequence assessment and risk estimation)
- risk management
- risk communication.

Hazard identification, risk assessment and risk management are sequential steps within a risk analysis, while risk communication is conducted as an ongoing process and includes both formal and informal consultation with stakeholders.

This Issues Paper has drawn on the following sources of information:

- the 1999 *Import risk analysis on non-viable salmonids and non-salmonid marine finfish* (AQIS 1999a)
- the 1999 *Import Risk Analysis on Live Ornamental Finfish* (AQIS 1999b)
- the 2014 *Importation of freshwater ornamental fish: review of biosecurity risks associated with gourami iridovirus and related viruses: Final import risk analysis report*
- the OIE Code (OIE 2021a)
- the OIE Manual of diagnostic tests for aquatic animals (OIE 2021b)
- opinions of subject matter experts
- a review of relevant scientific literature.

Given the key objective of this Issues Paper is to document the approach and results of the hazard identification, only this step of the risk analysis process is discussed in further detail. Full details of the risk analysis methodology will be provided in the draft BIRA report when it is released, or stakeholders can contact the department for further information.

3 Hazard identification

Hazard identification is described in the OIE Code (Article 2.1.2) as a classification step that is undertaken to identify potential hazards that may be associated with the importation of a commodity (OIE 2021a). A hazard is a disease agent with the potential for harm.

In accordance with the OIE Code, a disease agent was considered a potential hazard relevant to the importation of live sturgeon or their eggs if it was assessed to be:

- 1) a known disease of sturgeon (*Acipenser* and *Huso* species only)
- 2) OIE listed, an emerging disease, or if it can produce adverse consequences in Australia
- 3) it was not known to be present in Australia, or

- 4) it is present in Australia and a notifiable disease and subject to an official control or eradication program.

Siberian sturgeon (*A. baerii*) and beluga sturgeon (*H. huso*) are the only species considered for import under the BIRA. However, due to the limited research and available information on the health of sturgeon in general, a conservative approach was taken and any disease agent reported from any species in the genera *Acipenser* and *Huso* were considered a potential hazard unless there was evidence to the contrary. Table 1 lists the species in the *Acipenser* and *Huso* that were considered. It was assumed that if any species in *Acipenser* and *Huso* were susceptible to a disease agent then Siberian and beluga sturgeon would also be susceptible. Where evidence for the inclusion or exclusion of a disease agent was ambiguous, a judgement was made based on the strength of the available evidence.

Table 1 *Acipenser* and *Huso* species

| Species name | Common name(s) |
|----------------------------------|--|
| <i>Acipenser baerii</i> | Siberian sturgeon |
| <i>Acipenser brevirostrum</i> | Shortnose sturgeon |
| <i>Acipenser dabryanus</i> | Yangtze sturgeon, Dabry's sturgeon |
| <i>Acipenser fulvescens</i> | Lake sturgeon, Rock sturgeon |
| <i>Acipenser gueldenstaedtii</i> | Danube sturgeon, Russian sturgeon, Diamond sturgeon |
| <i>Acipenser medirostris</i> | Green sturgeon |
| <i>Acipenser mikadoi</i> | Sakhalin sturgeon |
| <i>Acipenser naccarii</i> | Adriatic sturgeon |
| <i>Acipenser nudiventris</i> | Fringebarbel sturgeon, Thorn sturgeon, Bastard sturgeon, Ship sturgeon, Spiny sturgeon |
| <i>Acipenser oxyrinchus</i> | Atlantic sturgeon |
| <i>Acipenser persicus</i> | Persian sturgeon |
| <i>Acipenser ruthenus</i> | Sterlet sturgeon |
| <i>Acipenser schrenckii</i> | Amur sturgeon, Japanese sturgeon |
| <i>Acipenser sinensis</i> | Chinese sturgeon |
| <i>Acipenser stellatus</i> | Starry sturgeon, Stellate sturgeon |
| <i>Acipenser sturio</i> | Common sturgeon, European sea sturgeon, Atlantic sturgeon, Baltic sturgeon |
| <i>Acipenser transmontanus</i> | White sturgeon |
| <i>Huso dauricus</i> | Kaluga |
| <i>Huso huso</i> | Beluga, Beluga sturgeon, Giant sturgeon |

Source: Fishbase ([FAMILY Details for Acipenseridae - Sturgeons \(fishbase.se\)](https://www.fishbase.org/FAMILYDETAILS/FAMILYDETAILS.cfm?family=Acipenseridae))

The identity of any hazard should be clearly defined to ensure that the assessment is being performed on a distinct agent, and that biological and other information used in the assessment is relevant to the agent in question. If this is not possible because the causal agent of particular symptoms has not yet been fully identified, then it should have been shown to produce consistent symptoms and to be transmissible.

3.1 Potential hazards

Table 2 shows the list of potential hazards identified through this Issues Paper and summarises the results of the hazard identification process, including the reason for retention of each disease agent.

Many disease agents of sturgeon are ubiquitous and may be present in Australia. There are others that are opportunistic, not reported to be pathogenic, or of uncertain relevance in the commodity due to limited or insufficient information. All these disease agents were considered potential hazards when compiling the list. However, a potential hazard could only be considered a hazard if it met the criteria outlined in section 3 Hazard identification.

Table 2 Hazard identification and refinement

| Pathogenic agent (disease) | Susceptible species | OIE-listed disease? (Yes/No) | Adverse consequences in Australia? (Yes/No) | Present in Australia? (Yes/No) | Retained for risk assessment? (Yes/No: reason) | Reference(s) |
|---|---|------------------------------|---|--|---|---|
| Viruses | - | - | - | - | - | - |
| Acipenserid herpes virus 1 and 2 (Sturgeon alloherpesviruses) | Sturgeon | No | Yes | No | Yes: evidence of susceptibility in sturgeon, is not present in Australia, and may cause mortalities in cultured susceptible fish and also lead to secondary infections. | (Goodwin 2012; Kelley et al. 2005; Kurobe et al. 2008; Shchelkunov et al. 2009; Waltzek et al. 2009; LaPatra et al. 2014; Mugetti et al. 2020a) |
| Carp sprivivirus (spring viraemia of carp virus) | Primarily a disease of cyprinids but can infect other species of fish, including sturgeon | Yes | Yes | No | Yes: OIE-listed, not present in Australia, evidence of susceptibility in sturgeon and can cause significant mortalities in cultured susceptible fish. | (Ahne et al. 2002; Vicenova et al. 2011) |
| Cyprinid herpesvirus 3 (koi herpesvirus) (Koi herpesvirus disease) | Primarily a disease of cyprinids but can infect other species of fish, including sturgeon | Yes | Yes | No | Yes: OIE-listed, not present in Australia, evidence of susceptibility in sturgeon and can cause significant mortalities in cultured susceptible fish. | (Haenen et al. 2004; Kempter et al. 2009) |
| Frog virus 3 | Amphibians, reptiles, and fish, including sturgeon | Yes | Yes | No – other <i>Ranavirus</i> species are present in Australia | Yes: Frog virus 3 is not present in Australia and may cause mortalities in susceptible species. | (Duffus et al. 2015; Waltzek et al. 2014) |
| Red-spotted grouper nervous necrosis virus (Viral encephalopathy and retinopathy) | Wide range of fish, and has been reported in sturgeon | No | Yes | Yes | No: present in Australia and although viral encephalopathy and retinopathy is included on <i>Australia's National list of reportable diseases of aquatic animals</i> it is not subject to control or eradication. | (Athanassopoulou et al. 2004; Department of Agriculture and Water Resources 2017) |
| Salmonid novirhabdovirus (infectious haematopoietic necrosis virus) | Primarily a disease of salmonids but can infect other species of fish, including sturgeon | Yes | Yes | No | Yes: OIE-listed, evidence of susceptibility in sturgeon, not present in Australia, and may cause significant mortalities in cultured susceptible fish. | (Bootland and Leong 1999; LaPatra et al. 1995) |

| Pathogenic agent (disease) | Susceptible species | OIE-listed disease? (Yes/No) | Adverse consequences in Australia? (Yes/No) | Present in Australia? (Yes/No) | Retained for risk assessment? (Yes/No: reason) | Reference(s) |
|---|---|------------------------------|---|--------------------------------|--|--|
| Sturgeon nucleocytoplasmic large DNA viruses (White sturgeon iridovirus, Missouri River sturgeon iridovirus, Namao virus, shortnose sturgeon virus, Russian sturgeon iridovirus, British Columbia white sturgeon virus) | Sturgeon | No | Yes | No | Yes: evidence of susceptibility in sturgeon, is not present in Australia, and may cause significant mortalities in cultured susceptible fish. | (Hedrick et al. 1992; LaPatra et al. 1994; Raverty et al. 2003; Bigarré et al. 2017; Hofsoe-Oppermann et al. 2019; Mugetti et al. 2020a; 2020b; Rud et al. 2020) |
| Viral haemorrhagic septicaemia virus (VHSV) (viral haemorrhagic septicaemia) | Primarily a disease of salmonids but can infect other species of fish | Yes | Yes | No | No: OIE-listed and sturgeon cell lines can be infected with VHSV and display a cytopathic effect but not enough evidence to determine sturgeon are susceptible to VHSV. | (Bruch et al. 2016; Ryu et al. 2018) |
| White sturgeon adenovirus (WSAdV-1) | Sturgeon | No | No | No | No: since the initial report there has been no evidence of adverse consequences associated with the disease agent reported. | (Hedrick et al. 1985) |
| Bacteria | - | - | - | - | - | - |
| <i>Acinetobacter</i> species | Wide range of fish, including sturgeon | No | No | Yes | No: present in Australia, is not included on <i>Australia's National list of reportable diseases of aquatic animals</i> and is not subject to control or eradication and no evidence of adverse consequences associated with the disease agent reported. | (Kayaş et al. 2017) |

| Pathogenic agent (disease) | Susceptible species | OIE-listed disease? (Yes/No) | Adverse consequences in Australia? (Yes/No) | Present in Australia? (Yes/No) | Retained for risk assessment? (Yes/No: reason) | Reference(s) |
|--|---|------------------------------|---|--|--|--|
| <i>Aeromonas hydrophila</i> | Wide range of fish, including sturgeon and prawns | No | No | Yes | No: present in Australia, is not included on <i>Australia's National list of reportable diseases of aquatic animals</i> and is not subject to control or eradication and no evidence of adverse consequences associated with the disease agent reported. | (AQIS 1999a; Noga 2010; Kayış et al. 2017) |
| <i>Aeromonas salmonicida</i> (both typical and atypical strains) | Primarily a disease of salmonids but can infect other species of farmed fish, including farmed sturgeon | No | Yes | Yes – some strains have been reported in Australia | Yes: wide host range, including sturgeon, the typical strain is not present in Australia, and may cause mass mortalities in cultured susceptible fish. | (Mohler 2003; AQIS 1999a; 1999b) |
| <i>Aeromonas sobria</i> | Wide range of fish, including sturgeon | No | No | Yes | No: present in Australia, is not included on <i>Australia's National list of reportable diseases of aquatic animals</i> and is not subject to control or eradication and no evidence of adverse consequences associated with the disease agent reported. | (Kayış et al. 2017) |
| <i>Aeromonas veronii</i> | Wide range of fish, including sturgeon | No | No | Yes | No: present in Australia, is not included on <i>Australia's National list of reportable diseases of aquatic animals</i> and is not subject to control or eradication and no evidence of adverse consequences associated with the disease agent reported. | (Ma et al. 2009; Sinclair et al. 2016) |

| Pathogenic agent (disease) | Susceptible species | OIE-listed disease? (Yes/No) | Adverse consequences in Australia? (Yes/No) | Present in Australia? (Yes/No) | Retained for risk assessment? (Yes/No: reason) | Reference(s) |
|---|---|------------------------------|---|--------------------------------|--|---------------------------------------|
| <i>Bacillus mycoides</i> | Wide range of fish, including sturgeon | No | No | Yes | No: present in Australia, is not included on <i>Australia's National list of reportable diseases of aquatic animals</i> and is not subject to control or eradication and no evidence of adverse consequences associated with the disease agent reported. | (Kayiş et al. 2017) |
| <i>Carnobacterium</i> species | Wide range of fish, including sturgeon | No | No | Yes | No: present in Australia, is not included on <i>Australia's National list of reportable diseases of aquatic animals</i> and is not subject to control or eradication and no evidence of adverse consequences associated with the disease agent reported. | (Kim et al. 2015; Ciulli et al. 2020) |
| <i>Chlamydia</i> species (Eptheliocystis) | Wide range of fish, some species specific to sturgeon | No | No | Yes | No: <i>Chlamydia</i> spp. are present in Australia, is not included on <i>Australia's National list of reportable diseases of aquatic animals</i> and is not subject to control or eradication, and no evidence of adverse consequences associated with the sturgeon specific species. | (Groff et al. 1996) |
| <i>Citrobacter freundii</i> | Wide range of fish, including sturgeon | No | No | Yes | No: present in Australia, is not included on <i>Australia's National list of reportable diseases of aquatic animals</i> and is not subject to control or eradication and no evidence of adverse consequences associated with the disease agent reported. | (Ciulli et al. 2020) |

| Pathogenic agent (disease) | Susceptible species | OIE-listed disease? (Yes/No) | Adverse consequences in Australia? (Yes/No) | Present in Australia? (Yes/No) | Retained for risk assessment? (Yes/No: reason) | Reference(s) |
|------------------------------------|--|------------------------------|---|--------------------------------|--|--------------------------------|
| <i>Edwardsiella tarda</i> | Wide range of fish, including sturgeon | No | No | Yes | No: present in Australia, is not included on <i>Australia's National list of reportable diseases of aquatic animals</i> and is not subject to control or eradication and no evidence of adverse consequences associated with the disease agent reported. | (AQIS 1999a; Yang et al. 2018) |
| <i>Flexibacter</i> species | Wide range of fish, including sturgeon and crustaceans | No | No | Yes | No: present in Australia, is not included <i>Australia's National list of reportable diseases of aquatic animals</i> and is not subject to control or eradication and no evidence of adverse consequences associated with the disease agent reported. | (Handler et al. 1997) |
| <i>Mycobacterium chelonae</i> | Sturgeon | No | No | No | No: no evidence of significant adverse consequences associated with the disease agent reported. | (Antuofermo et al. 2014) |
| <i>Mycobacterium ulcerans</i> | Sturgeon | No | No | No | No: no evidence of significant adverse consequences associated with the disease agent reported. | (Zhang et al. 2018) |
| <i>Mycobacterium salmoniphilum</i> | Primarily a disease of salmonids but can infect sturgeon | No | No | Yes | No: present in Australia, is not included on <i>Australia's National list of reportable diseases of aquatic animals</i> and is not subject to control or eradication and no evidence of adverse consequences associated with the disease agent reported. | (Righetti et al. 2014) |

| Pathogenic agent (disease) | Susceptible species | OIE-listed disease? (Yes/No) | Adverse consequences in Australia? (Yes/No) | Present in Australia? (Yes/No) | Retained for risk assessment? (Yes/No: reason) | Reference(s) |
|-----------------------------|--|------------------------------|---|---|--|---|
| <i>Pasteurella</i> species | Wide range of fish, including sturgeon | No | No | Yes – some species present in Australia | No: present in Australia, is not included on <i>Australia's National list of reportable diseases of aquatic animals</i> and is not subject to control or eradication and no evidence of adverse consequences associated with the disease agent reported. | (Costinar et al. 2010) |
| <i>Pseudomonas</i> species | Sturgeon | No | No | Yes – some species present in Australia | No: <i>Pseudomonas alcaligenes</i> is known to infect cultured Chinese sturgeon, <i>A. sinensis</i> but <i>P. alcaligenes</i> is present in Australia and no evidence of adverse consequences associated with the disease agent reported. | (Twigg and Socha 2001; Xu et al. 2015) |
| <i>Streptococcus iniae</i> | Wide range of fish, including sturgeon | No | No | Yes | No: present in Australia, is not included on <i>Australia's National list of reportable diseases of aquatic animals</i> and is not subject to control or eradication and no evidence of adverse consequences associated with the disease agent reported. | (Bromage et al. 1999; Deng et al. 2017; Pierezan et al. 2020) |
| <i>Vibrio alginolyticus</i> | Sturgeon | No | No | Yes | No: present in Australia, is not included on <i>Australia's National list of reportable diseases of aquatic animals</i> and is not subject to control or eradication and no evidence of adverse consequences associated with the disease agent reported. | (Costinar et al. 2010) |

| Pathogenic agent (disease) | Susceptible species | OIE-listed disease? (Yes/No) | Adverse consequences in Australia? (Yes/No) | Present in Australia? (Yes/No) | Retained for risk assessment? (Yes/No: reason) | Reference(s) |
|---|---|------------------------------|---|--|---|--|
| <i>Vibrio anguillarum</i> | Wide range of fish, including sturgeon | No | No | Yes | No: present in Australia, is not included on <i>Australia's National list of reportable diseases of aquatic animals</i> and is not subject to control or eradication and no evidence of adverse consequences associated with the disease agent reported. | (Munday et al. 1992; Zaharia and Dumitrescu 2011) |
| <i>Vibrio vulnificus</i> (biotype 2) | Wide range of fish, including sturgeon | No | No | Yes | No: present in Australia, is not included on <i>Australia's National list of reportable diseases of aquatic animals</i> and is not subject to control or eradication and no evidence of adverse consequences associated with the disease agent reported. | (Safari et al. 2015) |
| <i>Yersinia ruckeri</i> – Hagerman strain (Enteric redmouth disease) | Wide range of fish, including sturgeon and salmonids | No | Yes | No – other strains of <i>Yersinia ruckeri</i> are present in Australia | Yes: wide host range, not present in Australia, evidence sturgeon are involved in epidemiology and may cause significant mortalities in cultured susceptible fish. | (Barnes 2011; Shaowu et al. 2013; Vuillaume et al. 1987) |
| Fungi/oomycete | - | - | - | - | - | - |
| <i>Achlya</i> species | Wide range of fish, freshwater and marine crustaceans | No | No | Yes – some species reported in Australia | No: some species are present in Australia, is not included on <i>Australia's National list of reportable diseases of aquatic animals</i> and is not subject to control or eradication and no significant adverse consequences associated with the disease agent reported. | (Bauer et al. 2002) |

| Pathogenic agent (disease) | Susceptible species | OIE-listed disease? (Yes/No) | Adverse consequences in Australia? (Yes/No) | Present in Australia? (Yes/No) | Retained for risk assessment? (Yes/No: reason) | Reference(s) |
|---|---|------------------------------|---|--|---|--------------------------------|
| <i>Aphanomyces</i> species | Wide range of fish, including sturgeon | No | No | Yes – some species reported in Australia | No: some species are present in Australia, is not included on <i>Australia's National list of reportable diseases of aquatic animals</i> and is not subject to control or eradication and no significant adverse consequences associated with the disease agent reported. | (Bauer et al. 2002) |
| <i>Dactyulus</i> species | Sturgeon | No | No | No | No: no evidence of significant adverse consequences associated with the disease agent reported. | (Bauer et al. 2002) |
| <i>Leptomitius lacteus</i> | Wide range of fish, including sturgeon (affects eggs/larvae only) | No | No | No | No: evidence of susceptibility in sturgeon but only infects sturgeon eggs and there is no evidence of significant adverse consequences associated with the disease agent reported in susceptible species. | (Czeczuga et al. 2011) |
| <i>Pleistophora sulci</i> | Sturgeon | No | No | No | No: no evidence of significant adverse consequences associated with the disease agent reported. | (Bauer et al. 2002) |
| <i>Saprolegnia</i> species (Saprolegniosis) | Wide range of fish, including sturgeon | No | No | Yes | No: present in Australia, is not included on <i>Australia's National list of reportable diseases of aquatic animals</i> and is not subject to control or eradication and no significant adverse consequences associated with the disease agent reported. | (Noga 2000; Kayış et al. 2017) |

| Pathogenic agent (disease) | Susceptible species | OIE-listed disease? (Yes/No) | Adverse consequences in Australia? (Yes/No) | Present in Australia? (Yes/No) | Retained for risk assessment? (Yes/No: reason) | Reference(s) |
|---|--|------------------------------|---|--|--|----------------------|
| <i>Zeptolognia</i> species | Sturgeon | No | No | Yes | No: present in Australia, is not included on <i>Australia's National list of reportable diseases of aquatic animals</i> and is not subject to control or eradication and no significant adverse consequences associated with the disease agent reported. | (Bauer et al. 2002) |
| Protozoa | - | - | - | - | - | - |
| Amoebozoa (Amoebic Gill Disease) | Wide range of fish, including sturgeon | No | Yes | Yes – some species reported in Australia | No: present in Australia, is not included on <i>Australia's National list of reportable diseases of aquatic animals</i> and is not subject to control or eradication. | (Hughes et al. 2001) |
| <i>Apiosoma</i> species | Wide range of fish, including sturgeon | No | No | No | No: no evidence of significant adverse consequences associated with the disease agent reported. | (Bauer et al. 2002) |
| Ciliates (Including <i>Ichthyophthirius multifiliis</i>) | Wide range of fish, including sturgeon | No | No | Yes – some species reported in Australia | No: present in Australia, is not included on <i>Australia's National list of reportable diseases of aquatic animals</i> and is not subject to control or eradication and no significant adverse consequences associated with the disease agent reported. | (AQIS 1999a) |
| <i>Cryptobia</i> species | Sturgeon | No | No | No | No: no evidence of significant adverse consequences associated with the disease agent reported. | (Bauer et al. 2002) |
| <i>Eimeria</i> species | Sturgeon | No | No | No | No: no evidence of significant adverse consequences associated with the disease agent reported. | (Bauer et al. 2002) |

| Pathogenic agent (disease) | Susceptible species | OIE-listed disease? (Yes/No) | Adverse consequences in Australia? (Yes/No) | Present in Australia? (Yes/No) | Retained for risk assessment? (Yes/No: reason) | Reference(s) |
|--|--|------------------------------|---|--|---|-------------------------------------|
| Euglenozoa - including <i>Enteromyxum</i> species, <i>Henneguya</i> species, <i>Kudoa</i> species, <i>Myxobolus</i> species, <i>Parvicapsula</i> species, <i>Sphaerospora</i> species, <i>Thelohanellus</i> species, <i>Unicapsula</i> species | Wide range of fish, including sturgeon | No | No | Yes – some species reported in Australia | No: some species are present in Australia, is not included on <i>Australia's National list of reportable diseases of aquatic animals</i> and is not subject to control or eradication and no significant adverse consequences associated with the disease agent reported. | (Noga 2000) |
| <i>Glugea</i> species | Wide range of fish, including sturgeon | No | No | No | No: no evidence of significant adverse consequences associated with the disease agent reported. | (Bauer et al. 2002) |
| <i>Haemogregarina acipenseris</i> | Wide range of fish, including sturgeon | No | No | No | No: no evidence of significant adverse consequences associated with the disease agent reported. | (Bauer et al. 2002) |
| <i>Hexamita truttae</i> | Sturgeon | No | No | No | No: no evidence of significant adverse consequences associated with the disease agent reported. | (Bauer et al. 2002) |
| <i>Nitzschia</i> species | Sturgeon | No | No | No | No: only reported in sturgeon during marine life phase and no evidence of adverse consequences associated with the disease agent reported. | (Bauer et al. 2002) |
| <i>Trichodina</i> species | Wide range of fish, including sturgeon | No | No | Yes – some species present in Australia | No: some species are present in Australia, is not included on <i>Australia's National list of reportable diseases of aquatic animals</i> and is not subject to control or eradication and no significant adverse consequences associated with the disease agent reported. | (Bauer et al. 2002; Moghaddam 2015) |

| Pathogenic agent (disease) | Susceptible species | OIE-listed disease? (Yes/No) | Adverse consequences in Australia? (Yes/No) | Present in Australia? (Yes/No) | Retained for risk assessment? (Yes/No: reason) | Reference(s) |
|---|---|------------------------------|---|--|--|---|
| <i>Trypanosoma anura</i> | Sturgeon | No | No | No | No: no evidence of significant adverse consequences associated with the disease agent reported. | (Bauer et al. 2002) |
| <i>Zschokkella sturionis</i> | Sturgeon | No | No | No | No: no evidence of significant adverse consequences associated with the disease agent reported. | (Bauer et al. 2002) |
| Metazoa | - | - | - | - | - | - |
| <i>Argulus coregoni</i> and <i>Argulus foliaceus</i> (Fish louse) | Wide range of fish, including sturgeon, cyprinids and salmonids | No | Yes | No | Yes: wide host range, not present in Australia, can be vectors for other diseases and may cause mass mortalities in juvenile cultured fish. | (Paperna 1991; AQIS 1999b; Bauer et al. 2002) |
| <i>Caligus elongatus</i> | Wide range of fish, including sturgeon and salmonids | No | No | Yes | No: present in Australia, is not included on <i>Australia's National list of reportable diseases of aquatic animals</i> and is not subject to control or eradication. | (AQIS 1999a) |
| Cestodes - including <i>Amphilina foliacea</i> , <i>Amphilina japonica</i> , <i>Bothriomonus fallax</i> , <i>Cyathocephalus truncates</i> , <i>Eubothrium acipenserinum</i> | Wide range of fish and turtles, including sturgeon | No | No | Yes – some species reported in Australia | No: some species are present in Australia, is not included on <i>Australia's National list of reportable diseases of aquatic animals</i> and is not subject to control or eradication and no significant adverse consequences associated with the sturgeon species reported. | (Bauer et al. 2002; Bosi et al. 2005) |
| <i>Dermocystidium</i> species | Wide range of fish, including sturgeon | No | No | No | No: no evidence of adverse consequences associated with the disease agent reported. | (Yanong 2003) |

| Pathogenic agent (disease) | Susceptible species | OIE-listed disease? (Yes/No) | Adverse consequences in Australia? (Yes/No) | Present in Australia? (Yes/No) | Retained for risk assessment? (Yes/No: reason) | Reference(s) |
|--|--|------------------------------|---|--|--|--|
| <i>Dichelesthium oblongum</i> | Sturgeon | No | No | No | No: only reported in sturgeon during marine life phase and no evidence of adverse consequences associated with the disease agent reported. | (Bauer et al. 2002) |
| Digeneans - including <i>Acrolichanus auriculatus</i> and <i>Skrjabinopsolus</i> species | Wide range of fish, including sturgeon | No | No | Yes – some species reported in Australia | No: some species are present in Australia, is not included on <i>Australia's National list of reportable diseases of aquatic animals</i> and is not subject to control or eradication and no significant adverse consequences associated with the sturgeon species reported. | (Bauer et al. 2002) |
| <i>Ergasilus sieboldi</i> | Wide range of fish, including sturgeon | No | Yes | No | Yes: wide host range, not present in Australia, and may cause severe gill damage, anaemia and secondary infection, sometimes resulting in heavy losses of fish stocks. | (Schäperclaus 1991; AQIS 1999b; Bauer et al. 2002) |
| <i>Ichthyophonus hoferi</i> | Wide range of fish, including sturgeon | No | No | Yes | No: present in Australia, is not included on <i>Australia's National list of reportable diseases of aquatic animals</i> and is not subject to control or eradication and no significant adverse consequences associated with the disease agent reported. | (Hershberger et al. 2010) |
| <i>Lernaea cyprinacea</i> | Wide range of fish, including sturgeon | No | Yes | Yes | No: present in Australia, is not included on <i>Australia's National list of reportable diseases of aquatic animals</i> and is not subject to control or eradication. | (AQIS 1999b; Bauer et al. 2002) |

| Pathogenic agent (disease) | Susceptible species | OIE-listed disease? (Yes/No) | Adverse consequences in Australia? (Yes/No) | Present in Australia? (Yes/No) | Retained for risk assessment? (Yes/No: reason) | Reference(s) |
|--|--|------------------------------|---|--|--|--------------------------------------|
| Monogeneans - including <i>Diclybothrium armatum</i> and <i>Diclybothrium hamulatum</i> | Sturgeon | No | No | Yes - some species reported in Australia | No: some species are present in Australia, is not included on <i>Australia's National list of reportable diseases of aquatic animals</i> and is not subject to control or eradication and no significant adverse consequences associated with the sturgeon species reported. | (Bauer et al. 2002) |
| Nematodes - including <i>Anisakis schupakowi</i> , <i>Cucullanus</i> species, <i>Hysterothylacium</i> species and <i>Piscicapillaria tuberculata</i> | Wide range of fish, including sturgeon | No | No | Yes - some species reported in Australia | No: some species are present in Australia, is not included on <i>Australia's National list of reportable diseases of aquatic animals</i> and is not subject to control or eradication and no significant adverse consequences associated with the sturgeon species reported. | (Bauer et al. 2002; Noga 2000) |
| <i>Paradydibothrium padficum</i> | Sturgeon | No | No | No | No: only reported in sturgeon during marine life phase and no evidence of adverse consequences associated with the disease agent reported. | (Bauer et al. 2002) |
| <i>Polypodium hydriforme</i> | Sturgeon | No | Yes | No | Yes: evidence of susceptibility in sturgeon, not present in Australia, and infects eggs, which decreases the quality of the caviar and may reduce the reproductive potential of the host. | (Raikova 2002; Okamura et al. 2020). |
| <i>Pseudotracheiastes stellatus</i> | Sturgeon | No | No | No | No: no evidence of significant adverse consequences associated with the disease agent reported. | (Bauer et al. 2002) |

| Pathogenic agent (disease) | Susceptible species | OIE-listed disease? (Yes/No) | Adverse consequences in Australia? (Yes/No) | Present in Australia? (Yes/No) | Retained for risk assessment? (Yes/No: reason) | Reference(s) |
|--|--|------------------------------|---|--|--|---|
| Trematodes - including <i>Aspidogaster limacoides</i> , <i>Deropristis hispida</i> , <i>Diplostomum spathaceum</i> , <i>Pristicola</i> species, <i>Rhipidocotyle kovalae</i> | Wide range of fish, including sturgeon | No | No | Yes – some species reported in Australia | No: some species are present in Australia, is not included on <i>Australia's National list of reportable diseases of aquatic animals</i> and is not subject to control or eradication and no significant adverse consequences associated with the sturgeon species reported. | (Bauer et al. 2002; Choudhury 2009; Moghaddam 2015) |

3.2 Hazards retained for risk assessment

The following disease agents were identified as hazards and retained for risk assessment based on the information provided in Table 2:

- Acipenserid herpes virus 1 and 2 (sturgeon alloherpesviruses)
- *Aeromonas salmonicida* (typical strain)
- *Argulus coregoni* and *Argulus foliaceus*
- *Carp sprivivirus* (spring viraemia of carp virus)
- Cyprinid herpesvirus 3 (koi herpesvirus)
- *Ergasilus sieboldi*
- Frog virus 3
- *Polypodium hydriforme*
- Salmonid novirhabdovirus (infectious haematopoietic necrosis virus)
- Sturgeon nucleocytoplasmic large DNA viruses
- *Yersinia ruckeri* (Hagerman strain only).

4 Responding to this Issues Paper

This Issues Paper gives stakeholders an opportunity to provide comment on and draw attention to any scientific, technical, or other gaps in the data, misinterpretations, and errors before the draft biosecurity import risk analysis (BIRA) report is completed. The department is particularly interested in receiving comments on:

- any additional known disease agents of sturgeon not named in the hazard identification
- additional information on the form (viable eggs or live animals) and volume of product expected to be imported (in the first year and then each subsequent years)
- the country the sturgeon is expected to be sourced from
- any additional information on the proposed sturgeon aquaculture facilities in Australia (for example, biosecurity plans to be implemented).

Please lodge any comments or submissions through our Have Your Say Page. Our public consultation will close on 22 August 2022. The department will carefully consider all submissions before releasing the draft BIRA report.

The department will provide information about the next consultation period following receipt and consideration of submissions generated by the Issues Paper. This information will be available at www.awe.gov.au/biosecurity-trade/policy/risk-analysis/animal/live-sturgeon-for-aquaculture or to receive updates on this process, [Register as a stakeholder](#). To receive notices about animal biosecurity policy and biosecurity risk analysis subscribe to [Biosecurity Risk Analysis Animal](#). Additional information on how the department conducts [risk analyses and our international obligations](#) is also available.

Glossary

| Term or abbreviation | Definition |
|---|---|
| Appropriate level of protection (ALOP) for Australia | The <i>Biosecurity Act 2015</i> defines the appropriate level of protection (or ALOP) for Australia as a high level of sanitary and phytosanitary protection aimed at reducing biosecurity risks to very low, but not to zero. |
| Approved arrangement | Approved arrangement (AA) is defined in the <i>Biosecurity Act 2015</i> as an arrangement for which an approval is in force under paragraph 406(1)(a) (including a varied arrangement for which an approval is in force under that paragraph as it applies because of subsection 412(3)). |
| Australian territory | Australian territory as referenced in the <i>Biosecurity Act 2015</i> refers to Australia, Christmas Island and Cocos (Keeling) Islands. |
| Australia's National List of Reportable Diseases of Aquatic Animals | States and territories are required to provide regular reports to the Australian Government (Department of Agriculture, Water and the Environment) on the status of the diseases on Australia's National List of Reportable Diseases of Aquatic Animals . The diseases on this list are also known as 'reportable diseases' |
| Biosecurity | The prevention of the entry, establishment or spread of unwanted pests and infectious disease agents to protect human, animal or plant health or life, and the environment. |
| Biosecurity control | Goods imported into an Australian territory are subject to biosecurity control, as outlined in the <i>Biosecurity Act 2015</i> . |
| Biosecurity measure | The <i>Biosecurity Act 2015</i> defines biosecurity measures as measures to manage any of the following: biosecurity risk, the risk of contagion of a listed human disease, the risk of listed human diseases entering, emerging, establishing themselves or spreading in Australian territory, and biosecurity emergencies and human biosecurity emergencies. |
| Biosecurity import risk analysis (BIRA) | The <i>Biosecurity Act 2015</i> defines a BIRA as an evaluation of the level of biosecurity risk associated with particular goods, or a particular class of goods, that may be imported, or proposed to be imported, into Australian territory, including, if necessary, the identification of conditions that must be met to manage the level of biosecurity risk associated with the goods, or the class of goods, to a level that achieves the ALOP for Australia. The risk analysis process is regulated under legislation. |
| Biosecurity risk | The <i>Biosecurity Act 2015</i> refers to biosecurity risk as the likelihood of a disease or pest entering, establishing or spreading in Australian territory, and the potential for the disease or pest causing harm to human, animal or plant health, the environment, economic or community activities. |
| Compartment | One or more aquaculture establishments under a common biosecurity management system containing an aquatic animal population with a distinct health status with respect to a specific disease or diseases for which required surveillance and control measures are applied and basic biosecurity conditions are met for the purposes of international trade. Such compartments must be clearly documented by the CA(ies). |
| Competent Authority | The Veterinary Authority or other Governmental Authority of a Member Country having the responsibility and competence for ensuring or supervising the implementation of aquatic animal health and welfare measures, international health certification and other standards and recommendations in the Aquatic Code in the whole territory. |
| The department | The Australian Government Department of Agriculture, Water and the Environment. |
| Endemic | Belonging to, native to, or prevalent in a particular geography, area or environment. |
| Goods | The <i>Biosecurity Act 2015</i> defines goods as an animal, a plant (whether moveable or not), a sample or specimen of a disease agent, a pest, mail or any other article, substance or thing (including, but not limited to, any kind of moveable property). |

| Term or abbreviation | Definition |
|-----------------------------|---|
| Host | An organism that harbours a parasite, mutual partner, or commensal partner, typically providing nourishment and shelter. |
| Import permit | Official document authorising a person to bring or import particular goods into Australian territory in accordance with specified import requirements. |
| Non-regulated risk analysis | Refers to the process for conducting a risk analysis that is not regulated under legislation (<i>Biosecurity import risk analysis guidelines 2016</i>). |
| OIE notifiable disease | A disease which is notifiable to OIE |
| Pathogen | A biological agent that can cause disease to its host. |
| Quarantine | Official confinement of regulated articles for observation and research or for further inspection, testing or treatment. |
| Risk analysis | Refers to the technical or scientific process for assessing the level of biosecurity risk associated with the goods, or the class of goods, and if necessary, the identification of conditions that must be met to manage the level of biosecurity risk associated with the goods, or class of goods to a level that achieves the ALOP for Australia. |
| SPS Agreement | WTO Agreement on the Application of Sanitary and Phytosanitary Measures. |
| Stakeholders | Government agencies, individuals, community or industry groups or organizations, whether in Australia or overseas, including the proponent/applicant for a specific proposal, who have an interest in the policy issues. |
| Surveillance | An official process which collects, and analyses information related to animal health. |
| Unrestricted risk | Unrestricted risk estimates apply in the absence of risk mitigation measures. |

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