



Harmonia^{+PL} – procedure of negative impact risk assessment for invasive alien species and potentially invasive alien species in Poland

Questionnaire

A0 | Context

Questions from this module identify the assessor and the biological, geographical & social context of the assessment.

a01. Name(s) of the assessor(s):

first name and family name

Wojciech Solarz

first name and family name

Karolina Mazurska

first name and family name

Henryk Okarma

acomment1.	Comments:	degree	affiliation	assessment date
		Dr.	Institute of Nature Conservation of the Polish Academy of Sciences in Cracow	20.12.2017
		degree	affiliation	assessment date
		M.Sc. degree	19.12.2017
		degree	affiliation	assessment date
		Prof.	Institute of Nature Conservation of the Polish Academy of Sciences in Cracow	21.12.2017

a02. Name(s) of the *Species* under assessment:

Polish name

Sterniczka jamajska

Latin name

Oxyura jamaicensis Gmelin, 1789

English name

Ruddy duck

acommm02.

Comments:

Polish name (synonym I)

Polish name (synonym II)

.....
Latin name (synonym I)

.....
Latin name (synonym II)

Anas jamaicensis

English name (synonym I)

.....
English name (synonym II)

Northern ruddy duck

.....

a03. Area under assessment:

Poland

acommm03.

Comments:

.....

a04. Status of the Species in Poland. The Species is:

native to Poland

alien, absent from Poland

alien, present in Poland only in cultivation or captivity

alien, present in Poland in the environment, not established

alien, present in Poland in the environment, established

X

aconff01.

Answer provided with a

low	medium	high X
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level of confidence

acommm04.

Comments:

in „Comments” (questions acomm04-41) experts should provide **explanations for their answers and list sources of information**. In particular, Comments should explain the decision in cases when data is lacking, incomplete or uncertain, or if the available information is contradictory.

Source of the information should also be provided here, with author and year of publication; data sources should be divided into P – published results of scientific research; B - databases; N – unpublished data; I - other; A – author’s own data. Detailed information (including full bibliographic record) should be provided at the end of the questionnaire "Data sources". Guidance on data sources citation is available at the end of the *Harmonia*^{PL} – procedure of negative impact risk assessment for invasive alien species and potentially invasive alien species in Poland.

Ruddy duck appears in the wild in Poland only accidentally (a total of about 15 records) and does not breed. (Komisja Faunistyczna 2010, 2011, 2012, 2013, 2015 – P, Gatunki obce w Polsce 2017 – B, Komisja Faunistyczna 2017 – I, Solarz W 2017 – A).

a05. The impact of the Species on major domains. The Species may have an impact on:

environmental domain

X

cultivated plants domain

domesticated animals domain

X
X

human domain

other domains

acommm05.

Comments:

Ruddy duck affects 3 domains: environmental, domesticated animals and human. The negative effect on environmental domain is manifested through hybridisation (Henderson 2010, Muñoz-Fuentes et al. 2012, Robertson et al. 2015, Recommendation No. 185 2016 – P, BirdLife International 2017 – I) and competition (Harmonia 2013 – B, BirdLife International 2017 – I) with the globally endangered White-headed duck *Oxyura leucocephala*, which may even lead to its complete extinction. The negative effect on domesticated animals and human domains is connected with transferring the avian influenza (strain H5N1), mortal for people and also for poultry and pigs (Rappole i Hubálek 2006, Hars et al. 2008 – P).

A1 | Introduction

Questions from this module assess the risk for the *Species* to overcome geographical barriers and - if applicable - subsequent barriers of captivity or cultivation. This leads to Introduction, defined as the entry of The Organism within the limits of The Area and subsequently into the wild.

a06. The probability for the *Species* to expand into Poland’s natural environments, **as a result of self-propelled expansion** after its earlier introduction outside of the Polish territory is:

low

medium

high

X

aconf02.

Answer provided with a

low	medium	high
		X

level of confidence

acommm06.

Comments:

The populations of the species are established in UK, France, Belgium and the Netherlands (Henderson 2013 – P). Although there are no established populations of the Ruddy duck in the neighbouring countries, thanks to its high mobility, the species is sporadically recorded in Poland. The behaviour of the recorded specimens indicates that these are wild birds, not escapees, thus it is very likely that they reach Poland from the populations in western Europe.

a07. The probability for the *Species* to be introduced into Poland’s natural environments by **unintentional human actions** is:

low

medium

high

X

aconf03.

Answer provided with a

low	medium	high
		X

level of confidence

acomm07.

Comments:

The Ruddy duck is a medium-size bird (average weight about 550-600 g, CABI 2017 – B), therefore the likelihood that it could be transported by unintentional human actions (e.g. as a contaminant of imported goods or a "stowaway" in transport or in luggage) is minimal.

a08. The probability for the *Species* to be introduced into Poland's natural environments by **intentional human actions** is:

low

medium

high

X

aconf04.

Answer provided with a

low	medium	high
	X	

level of confidence

acomm08.

Comments:

According to the methodology of Harmonia^{PL} procedure, intentional human action includes both releases and escaped of captive-bred individuals. The risk from both means of introduction is assessed together.

The species was intentionally transported to Europe for breeding in captivity, and then, as a result of escapes, established in the wild (Muñoz-Fuentes et al. 2012). Despite the fact that numerous stringent restrictions on trade in that species were introduced (it is listed in: a) Commission Regulation (EU) No 709/2010 of 22 July 2010 amending Council Regulation (EC) No 338/97 on the protection of species of wild fauna and flora by regulating trade therein, b) Commission Implementing Regulation (EU) 2016/1141 of 13 July 2016 adopting a list of invasive alien species of Union concern pursuant to Regulation (EU) No 1143/2014 of the European Parliament and of the Council, c) Ministry of Environment Regulation of 9 September 2011 adopting a list of alien species invasive for native species and habitats in Poland), there is still some level of trade in the "grey area" (e.g. some guidelines concerning breeding of Ruddy duck are still available on the Internet-http://www.ptakiozdobne.pl/138_Sterniczka_jamajska.html). The scale of trade and keeping is difficult to assess but one can expect that some individuals are still illegally kept in Poland. Although the numbers of captive birds cannot be high, because of high mobility of the species (Hudson 1976, Hughes et al. 1999 – P) the risk of escapes cannot be completely excluded (estimated at 1-10 cases/decade).

A2 | Establishment

Questions from this module assess the likelihood for the *Species* to overcome survival and reproduction barriers. This leads to *Establishment*, defined as the growth of a population to sufficient levels such that natural extinction within The Area becomes highly unlikely.

a09. Poland provides **climate** that is:

non-optimal

sub-optimal

optimal for establishment of the *Species*

X

aconf05.

Answer provided with a

low	medium	high
		X

level of confidence

acommm09.

Comments:

The climatic similarity of Poland and the eastern coast of UK (according to the picture 1 in Harmonia^{+PL} – procedure of negative impact risk assessment for invasive alien species and potentially invasive alien species in Poland) indicates that Ruddy duck could establish also in Poland. Moreover, the species is very tolerant to climate – in its natural range can easily adapt to the very different, even extreme climatic conditions. It is established in the Andes – from southern Chile to Columbia, in parts of Central America, United States, Canada and the Caribbean (del Hoyo et al. 1992 – P).

a10. Poland provides **habitat** that is:

non-optimal

sub-optimal

optimal for establishment of the *Species*

X

aconf06.

Answer provided with a

low	medium	high
		X

level of confidence

acommm10.

Comments:

The Ruddy duck inhabits very diverse watercourses and reservoirs, wetlands and fens (DAISIE 2008 – B). Wide distribution of the species in the UK before the beginning of the eradication programme indicates that Ruddy ducks could inhabit a wide range of habitats with both flowing and standing waters. It can be suspected that currently only a small fraction of optimum habitats are occupied by the Ruddy duck (Henderson 2013 – P).

A3 | Spread

Questions from this module assess the risk of the *Species* to overcome dispersal barriers and (new) environmental barriers within Poland. This leads to spread, in which vacant patches of suitable habitat become increasingly occupied from (an) already-established population(s) within Poland.

Note that spread is considered different from range expansions that stem from new introductions (covered by the *Introduction* module).

a11. The capacity of the *Species* to disperse within Poland by natural means, **with no human assistance**, is:

very low

low

medium

high

very high

X

aconf07.

Answer provided with a

low	medium	high
		X

level of confidence

acommm11.

Comments:

Single source dispersal (Type A)

Ruddy ducks reaching Poland display behaviour of wild birds (escape distance). This indicates that these are most likely long-distance migrants from populations in Western Europe, covering distance of at least a few hundred kilometers (Komisja Faunistyczna 2010, 2011, 2012, 2013, 2017 – I, Solarz 2017 – A).

Population expansion (Type B)

The species is able to spread fast with no human assistance. It occurred in the UK – in 1960 first Ruddy duck populations established in south-west of England (Hudson 1976 – P). Since then a very fast spread of the species in the remaining parts of England has been recorded, as well as in Wales and Scotland. At the end of the 1990s, the Ruddy duck occupied whole of the UK (Kershaw and Hughes 2002 – P).

a12. The frequency of the dispersal of the *Species* within Poland by **human actions** is:

low

medium

high

X

aconf08.

Answer provided with a

low	medium	high
	X	

level of confidence

acommm12.

Comments:

The Ruddy duck is a highly mobile species, easily escaping from captivity into suitable natural habitats (Hudson 1976, Hughes et al. 1999 – P). Despite there are numerous restrictions on trade in that species (question a08 – acomm08) it is still possible to buy it in the “grey area” (e.g. some guidelines on keeping and breeding of Ruddy duck are available on the Internet http://www.ptakiozdobne.pl/138_Sterniczka_jamajska.html). The scale of trade and keeping is difficult to assess but one can expect that some individuals are still illegally kept in Poland. Although the numbers of captive birds cannot be high, because of high mobility of the species (Hudson 1976, Hughes et al. 1999 – P) the risk of escapes cannot be completely excluded, particularly that some owners are not careful enough with respect to preventing escape of captive birds. The probability of ruddy ducks escape is estimated as medium, with 1-10 cases/decade.

A4a | Impact on environmental domain

Questions from this module qualify the consequences of the *Species* on wild animals and plants, habitats and ecosystems.

Impacts are linked to the conservation concern of targets. Native species that are of conservation concern refer to keystone species, protected and/or threatened. See, for example, Red Lists, protected species lists, or Annex II of the 92/43/EWG Directive. Ecosystems that are of conservation concern refer to natural systems that are the habitat of many threatened species. These include natural forests, dry grasslands, natural rock outcrops, sand dunes, heathlands, peat bogs, marshes, rivers & ponds that have natural banks, and estuaries (Annex I of the 92/43/EWG Directive).

Native species population declines are considered on the local scale: limited decline is considered as a (mere) drop in numbers; severe decline is considered as a (near) extinction. Similarly, limited ecosystem change is considered as transient and easily reversible; severe change is considered as persistent and hardly reversible.

a13. The effect of the *Species* on native species, through **predation, parasitism or herbivory** is:

inapplicable	
low	X
medium	
high	

aconf09. Answer provided with a

low	medium	high
	X	

 level of confidence

acomm13. Comments:
The Ruddy duck feeds on plants, seeds and small aquatic invertebrates (DAISIE 2008 – B). The impact of the species on native species through predation/herbivory has not been detected so far (Lafontaine 2013 – P), therefore it is classified as “low” (Harmonia 2013 – B).

a14. The effect of the *Species* on native species, through **competition** is:

low	
medium	
high	X

aconf10. Answer provided with a

low	medium	high
X		

 level of confidence

acomm14. Comments:
The species competes with the globally endangered White-headed duck (Harmonia 2013 – B, BirdLife International 2017 – I). The White-headed duck is only sporadically recorded in Poland but it is native for the European fauna and is strictly protected according to article 1, 2, and 4 of the Directive 2009/147/EC of the European Parliament and of the Council of 30 November 2009 on the conservation of wild birds (the Birds Directive). Moreover, because of its aggressive behaviour, the Ruddy duck competes also with other water birds, including species of conservation concern – Black-necked grebe *Podiceps nigricollis* and Little grebe *Tachybaptus ruficollis* (Harmonia 2013 – B), both strictly protected according to the national legislature.

a15. The effect of the *Species* on native species, through **interbreeding** is:

no / very low	
low	
medium	
high	
very high	X

aconf11. Answer provided with a

low	medium	high
		X

 level of confidence

acomm15.

Comments:

The Ruddy duck interbreeds with the globally endangered White-headed duck. Hybridization between these two species is the main factor accounting for the significant decrease in the population of the native species. It can even lead to its complete extinction due to genetic introgression (Henderson 2010, Muñoz-Fuentes et al. 2012, Robertson et al. 2015, Recommendation No. 185 2016 – P, BirdLife International 2017 – I). Although the White-headed duck is recorded only occasionally in Poland, it is native for the European fauna and strictly protected according to the article 1, 2 and 4. 1 of Birds Directive. All birds protected under this Directive are also protected in Poland. Therefore, although both species interbreed on the Iberian Peninsula and in north Africa, the risk assessment for Poland should address threats from the Ruddy duck in a wider perspective.

a16. The effect of the *Species* on native species by **hosting pathogens or parasites** that are harmful to them is:

very low

low

medium

high

very high

X

aconf12.

Answer provided with a

low	medium	high
		X

level of confidence

acomm16.

Comments:

The Ruddy duck is a vector of avian influenza, strain H5N1– the most dangerous and mortal for birds (Rappole i Hubálek 2006, Hars et al. 2008 – P). The avian influenza is one of the notifiable diseases listed by World Organization for Animal Health (OIE).

a17. The effect of the *Species* on ecosystem integrity, by **affecting its abiotic properties** is:

low

medium

high

X

aconf13.

Answer provided with a

low	medium	high
		X

level of confidence

acomm17.

Comments:

The effect of the species on ecosystem integrity in the UK – from the establishment to the peak of the population (1960-2000) and subsequently – until now, seems to be negligible (Henderson 2013 – P). Therefore, it is estimated that the impact of the species on ecosystem integrity due to affecting its abiotic properties in other European countries, also in Poland, would be low, even under the assumption that the species establishes and spreads throughout the country.

a18. The effect of the *Species* on ecosystem integrity, by **affecting its biotic properties** is:

low

medium

high

X

aconf14.

Answer provided with a

low	medium	high X
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level of confidence

acommm18.

Comments:

The effect of the species on ecosystem integrity in the UK – from the establishment to the peak of the population (1960-2000) and subsequently – until now, seems to be negligible (Henderson 2013 – P). Therefore, it is estimated that the impact of the species on ecosystem integrity due to affecting its abiotic properties in other European countries, also in Poland, would be low, even under the assumption that the species establishes and spreads throughout the country.

A4b | Impact on cultivated plants domain

Questions from this module qualify the consequences of the *Species* on cultivated plants (e.g. crops, pastures, horticultural stock).

For the questions from this module, consequence is considered 'low' when presence of the *Species* in (or on) a population of target plants is sporadic and/or causes little damage. Harm is considered 'medium' when The Organism's development causes local yield (or plant) losses below 20%, and 'high' when losses range > 20%.

a19. The effect of the *Species* on cultivated plants targets through **herbivory or parasitism** is:

inapplicable

very low

low

medium

high

very high

X

aconf15.

Answer provided with a

low	medium	high X
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level of confidence

acommm19.

Comments:

Any effects of the species on cultivated plants targets through herbivory have not been recorded so far.

a20. The effect of the *Species* on cultivated plants targets through **competition** is:

inapplicable

very low

low

medium

high

very high

X

aconf16.

Answer provided with a

low	medium	high
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level of confidence

acomm20.

Comments:

The species is not a plant.

a21. The effect of the *Species* on cultivated plants targets through **interbreeding** with related species, including the plants themselves is:

inapplicable

no / very low

low

medium

high

very high

X

aconf17.

Answer provided with a

low	medium	high
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level of confidence

acomm21.

Comments:

The species is not a plant.

a22. The effect of the *Species* on cultivated plants targets by **affecting the cultivation system's integrity** is:

very low

low

medium

high

very high

X

aconf18.

Answer provided with a

low	medium	high
		X

level of confidence

acomm22.

Comments:

Any effects of the species on cultivated plants targets by affecting the cultivation system's integrity have not been noted so far. It can be stated with high level of confidence that if this kind of impact does occur, it will merely be „very low”, even if the species establishes and spreads in Poland.

a23. The effect of the *Species* on cultivated plants targets by hosting **pathogens or parasites** that are harmful to them is:

very low

low

medium

high

very high

X

aconf19.

Answer provided with a

low	medium	high
		X

level of confidence

acommm23.

Comments:

Hosting pathogens or parasites harmful to cultivated plants by the Ruddy duck has not been noted so far. There are no presumptions either indicating that any progress will be made in this respect due to scientific research.

A4c | Impact on domesticated animals domain

Questions from this module qualify the consequences of The Organism on domesticated animals (e.g. production animals, companion animals). It deals with both the well-being of individual animals and the productivity of animal populations.

a24. The effect of the *Species* on individual animal health or animal production, through **predation or parasitism** is:

- inapplicable
- very low
- low
- medium
- high
- very high

X

aconf20.

Answer provided with a

low	medium	high
-----	--------	------

level of confidence

acommm24.

Comments:

Ruddy duck is a herbivorous species.

a25. The effect of the *Species* on individual animal health or animal production, by having properties that are hazardous upon **contact**, is:

- very low
- low
- medium
- high
- very high

X

aconf21.

Answer provided with a

low	medium	high X
-----	--------	-----------

level of confidence

acommm25.

Comments:

Any effects of the species on individual animal health or animal production, by having properties that are hazardous upon contact have not been noted so far.

a26. The effect of the *Species* on individual animal health or animal production, by hosting **pathogens or parasites** that are harmful to them, is:

- inapplicable
- very low
- low

medium
high
very high

X

aconf22.

Answer provided with a

low	medium	high
		X

level of confidence

acommm26.

Comments:

The Ruddy duck is a vector of avian influenza, strain H5N1– the most dangerous and mortal for birds (Rappole i Hubálek 2006, Hars et al. 2008 – P). The avian influenza is one of the notifiable diseases listed by the World Organization for Animal Health (OIE). The virus causes very high morbidity and mortality in poultry, as well as in pigs.

A4d | Impact on human domain

Questions from this module qualify the consequences of The Organism on humans. It deals with human health, being defined as a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity (definition adopted from the World Health Organization).

a27. The effect of the *Species* on human health through **parasitism** is:

inapplicable
very low
low
medium
high
very high

X

aconf23.

Answer provided with a

low	medium	high

level of confidence

acommm27.

Comments:

The species is not a parasite.

a28. The effect of the *Species* on human health, by having properties that are hazardous upon **contact**, is:

very low
low
medium
high
very high

X

aconf24.

Answer provided with a

low	medium	high
		X

level of confidence

acomm28.

Comments:

Any effects of the species on human health, by having properties that are hazardous upon contact, have not been recorded yet.

a29. The effect of the *Species* on human health, by hosting **pathogens or parasites** that are harmful to humans, is:

inapplicable

very low

low

medium

high

very high

X

aconf25.

Answer provided with a

low	medium	high
		X

level of confidence

acomm29.

Comments:

The Ruddy duck is a vector of avian influenza, strain H5N1– the most dangerous and mortal for birds (Rappole i Hubálek 2006, Hars et al. 2008 – P). The avian influenza is one of the notifiable diseases listed by the World Organization for Animal Health (OIE). The avian influenza may be mortal also to people. It is possible to get infected with the disease by contact with sick animals, or with objects contaminated with their excrements. According to WHO, the mortality rate of people infected by H5N1 in 2003-2009 was about 60% (WHO – I).

A4e | Impact on other domains

Questions from this module qualify the consequences of the *Species* on targets not considered in modules A4a-d.

a30. The effect of the *Species* on causing damage to **infrastructure** is:

very low

low

medium

high

very high

X

aconf26.

Answer provided with a

low	medium	high
	X	

level of confidence

acomm30.

Comments:

Any effects of the species on causing damage to infrastructure have not been noted so far (Lafontaine 2013 – P).

A5a | Impact on ecosystem services

Questions from this module qualify the consequences of The Organism on ecosystem services. Ecosystem services are classified according to the Common International Classification of Ecosystem Services, which also includes many examples (CICES Version 4.3). Note that the answers to these questions are not used in the calculation of the

overall risk score (which deals with ecosystems in a different way), but can be considered when decisions are made about management of the *Species*.

a31. The effect of the *Species* on **provisioning services** is:

- significantly negative
- moderately negative
- neutral
- moderately positive
- significantly positive

X

aconf27. Answer provided with a

low	medium	high
	X	

 level of confidence

acomm31. Comments:
The effect of the Ruddy duck on provisioning services was assessed as moderately negative due to the fact that the species has an adverse impact on domesticated animals through the transfer of the avian influenza (strain H5N1). The virus causes very high morbidity and mortality in poultry, as well as in pigs.

a32. The effect of the *Species* on **regulation and maintenance services** is:

- significantly negative
- moderately negative
- neutral
- moderately positive
- significantly positive

X

aconf28. Answer provided with a

low	medium	high
	X	

 level of confidence

acomm32. Comments:
The effect of the Ruddy duck on regulation and maintenance services was assessed as moderately negative due to the fact that the species has an adverse impact on biological regulation – regulation of zoonoses through the transfer of the avian influenza (strain H5N1).

a33. The effect of the *Species* on **cultural services** is:

- significantly negative
- moderately negative
- neutral
- moderately positive
- significantly positive

X

aconf29. Answer provided with a

low	medium	high
	X	

 level of confidence

acomm33.

Comments:

Any effects of the Ruddy duck on cultural services have not been noted so far (Lafontaine 2013 – P). The species is very attractive and can be perceived by part of the society as a positive element of the ecosystem. On the other hand, due to the fact that the presence of the Ruddy duck can lead to the complete extinction of the native White-headed duck, it can contribute to its negative perception.

A5b | Effect of climate change on the risk assessment of the negative impact of the Species

Below, each of the Harmonia+ modules is revisited under the premise of the future climate. The proposed time horizon is the mid-21st century. We suggest to take into account the reports of the Intergovernmental Panel on Climate Change. Specifically, the expected changes of atmospheric variables listed in its 2013 report on the physical science basis may be used for this purpose. The global temperature is expected to rise by 1 to 2 °C by 2046-2065.

Note that the answers to these questions are not used in the calculation of the overall risk score, but can be but can be considered when decisions are made about management of the *Species*.

a34. INTRODUCTION – Due to climate change, the probability for the *Species* to overcome geographical barriers and - if applicable - subsequent barriers of captivity or cultivation in Poland will:

- decrease significantly
- decrease moderately
- not change
- increase moderately
- increase significantly

X

aconf30.

Answer provided with a

low	medium	high
		X

level of confidence

acomm34.

Comments:

The species is very tolerant to climate: in its native range it can easily adapt to very different, even extreme climatic conditions, see question a09 – acomm09). Climate change, therefore, should not have any significant effect on the probability to overcome geographical barriers and subsequent barriers of captivity or cultivation (Henderson 2013 – P).

a35. ESTABLISHMENT – Due to climate change, the probability for the *Species* to overcome barriers that prevented its survival and reproduction in Poland will:

- decrease significantly
- decrease moderately
- not change
- increase moderately
- increase significantly

X

aconf31.

Answer provided with a

low	medium	high
		X

level of confidence

acomm35.

Comments:

The species is very tolerant to climate: in its native range it can easily adapt to very different, even extreme climatic conditions, see question a09 – acomm09). Climate change, therefore, should not have any significant effect on the probability to overcome geographical barriers that prevented its survival and reproduction (Henderson 2013 – P).

a36. SPREAD – Due to climate change, the probability for the *Species* to overcome barriers that prevented its spread in Poland will:

- decrease significantly
- decrease moderately
- not change
- increase moderately
- increase significantly

X

aconf32.

Answer provided with a

low	medium	high
		X

level of confidence

acomm36.

Comments:

The species is very tolerant to climate: in its native range it can easily adapt to very different, even extreme climatic conditions, see question a09 – acomm09). Climate change, therefore, should not have any significant effect on the probability to overcome geographical barriers that prevented its spread (Henderson 2013 – P).

a37. IMPACT ON ENVIRONMENTAL DOMAIN – Due to climate change, the consequences of the *Species* on wild animals and plants, habitats and ecosystems in Poland will:

- decrease significantly
- decrease moderately
- not change
- increase moderately
- increase significantly

X

aconf33.

Answer provided with a

low	medium	high
		X

level of confidence

acomm37.

Comments:

Interbreeding between the Ruddy duck and the White-headed duck occurs in Spain and also in Morocco. It is very likely, that it will continue to progress to areas further to the south (Henderson 2013 – P). Due to the wide tolerance of the Ruddy duck to climatic conditions, climate change should not lead to an increase or decrease in its impact through interbreeding and competition on native species.

a38. IMPACT ON CULTIVATED PLANTS DOMAIN – Due to climate change, the consequences of the *Species* on cultivated plants and plant domain in Poland will:

- decrease significantly
- decrease moderately
- not change

X

increase moderately

increase significantly

aconf34.

Answer provided with a

low	medium	high
		X

level of confidence

acommm38.

Comments:

The species does not have any effect on cultivated plants and plant domain. It is very unlikely that this situation could be modified as a result of climate change.

a39. IMPACT ON DOMESTICATED ANIMALS DOMAIN – Due to climate change, the consequences of the *Species* on domesticated animals and animal production in Poland will:

decrease significantly

X

decrease moderately

not change

increase moderately

increase significantly

aconf35.

Answer provided with a

low	medium	high
		X

level of confidence

acommm39.

Comments:

The Ruddy duck is a vector of avian influenza (strain H5N1), a very dangerous disease, mortal for domesticated animals. It is very unlikely that this situation could be modified as a result of climate change.

a40. IMPACT ON HUMAN DOMAIN – Due to climate change, the consequences of the *Species* on human in Poland will:

decrease significantly

X

decrease moderately

not change

increase moderately

increase significantly

aconf36.

Answer provided with a

low	medium	high
		X

level of confidence

acommm40.

Comments:

The Ruddy duck is a vector of avian influenza (strain H5N1), a very dangerous disease, mortal for people. It is very unlikely that this situation could be modified as a result of climate change.

a41. IMPACT ON OTHER DOMAINS – Due to climate change, the consequences of the *Species* on other domains in Poland will:

decrease significantly

decrease moderately

not change

increase moderately

increase significantly

X

aconf37.

Answer provided with a

low	medium	high X
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level of confidence

acommm41.

Comments:

Any effect of the species on other domains (including causing damage to infrastructure) have not been noted so far. It is very unlikely that this situation could be modified as a result of climate change.

Summary

Module	Score	Confidence
Introduction (questions: a06-a08)	0.5	0.83
Establishment (questions: a09-a10)	1.0	1.0
Spread (questions: a11-a12)	0.75	0.75
Environmental impact (questions: a13-a18)	0.5	0.75
Cultivated plants impact (questions: a19-a23)	0.0	1.0
Domesticated animals impact (questions: a24-a26)	0.5	1.0
Human impact (questions: a27-a29)	0.5	1.0
Other impact (questions: a30)	0.0	0.5
Invasion (questions: a06-a12)	0.75	0.86
Impact (questions: a13-a30)	0.5	0.85
Overall risk score	0.38	
Category of invasiveness	Potentially invasive alien species	

A6 | Comments

This assessment is based on information available at the time of its completing. It has to be taken into account, however, that biological invasions are, by definition, very dynamic and unpredictable. This includes introductions of new alien species and detection of their negative impact. As a result, the assessment of the species may change in time. For this reason it is recommended that it regularly repeated.

Below you can include your own comments on the assessment.

acomm42.

Comments:

The Ruddy duck is one of the most dangerous invasive alien species in Europe, due to its hybridization with the White-headed duck, the globally endangered native species (BirdLife International 2017 – I). Geographically, this threat does not directly apply the territory of Poland, because neither of the two species breeds here and there are only sporadic records of single individuals (including hybrids).

Nevertheless, every single specimen of the Ruddy duck (including hybrids between the two species) recorded in Poland, should be eliminated. Such approach would increase the chances of success of the pan-European Ruddy duck eradication programme, aiming at total elimination of this species from the continent by 2020. Removal of such single birds in areas distant from the centre of the species occurrence is very important, because these can be individuals with a tendency to undertake very long-distance flights. Such birds are particularly likely to fly over to the area of native range of the White-headed duck in southern Europe and then to interbreed in that area. Moreover, while the eradication programme has been very intensive in western Europe, countries like Poland could become a safe refugium for the last individuals remaining in the wild. This would increase the risk of establishment in Poland and recovery of the population and thereby – could put at risk the success of the eradication programme (Recommendation No. 185 2016 – P).

Despite the threat from the Ruddy duck is well acknowledged, the risk assessment of the species for Poland classified the species as non-invasive. The highest value for negative the negative impact (0,5) was scored in 3 domains: environmental (questions: a13-a18, domesticated animals (questions: a24-a26) and human (questions: a27-a29). In all these domains the species fell just 0.01 below the threshold (0.51) allowing classification as moderately invasive. In the environmental domain, in three questions, including interbreeding with native species (question: a15), Ruddy duck reached the maximum possible value (1.0) with high level confidence (1.0). However the overall rating was reduced by half because of no impact in the remaining 3 questions of the domain (value 0.0).

It is noteworthy that the Ruddy duck scored relatively high (0.75) in modules related to the invasion process (questions: a06-a12), which indicates that the risk of introduction, establishment and spread of the species in Poland is substantial.

It should also be kept in mind that categories of invasiveness in this assessment were determined *a priori*, without knowledge of actual distribution of this parameter.

All these aspects should be taken into consideration in the decision process on how to deal with alien species and how to prioritise them.

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