



Appendix A

## Harmonia<sup>+PL</sup> – procedure for 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

1. Andrzej Zalewski
2. Marcin Brzeziński – external expert
3. Henryk Okarma

acomment1.	Comments:	degree	affiliation	assessment date
(1)		dr hab.	Mammal Research Institute Polish Academy of Sciences, Białowieża	29-01-2018
(2)		dr hab.	Faculty of Biology, University of Warsaw	20-01-2018
(3)		prof. dr hab.	Institute of Nature Conservation, Polish Academy of Sciences in Cracow	29-01-2018

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

Polish name: Koati  
Latin name: ***Nasua nasua*** Linnaeus, 1766  
English name: South American Coati

acommm02.	Comments:		
	Polish name (synonym I)	ostronos rudy	Polish name (synonym II) –
	Latin name (synonym I)	–	Latin name (synonym II) –
	English name (synonym I)	Coati	English name (synonym II) Coatimundi

**a03. Area under assessment:**

**Poland**

acommm03.	Comments:
	-

**a04. Status of the species in Poland. The species is:**

<input type="checkbox"/>	native to Poland
<input type="checkbox"/>	alien, absent from Poland
<input type="checkbox"/>	alien, present in Poland only in cultivation or captivity
<input checked="" type="checkbox"/>	alien, present in Poland in the environment, not established
<input type="checkbox"/>	alien, present in Poland in the environment, established

aconf01.	Answer provided with a	low	medium	high <b>X</b>	level of confidence
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acommm04.	Comments:
	The species does not occur in Poland. To date, there have been 2 observations of single coati from Poland (Solarz W. unpublished data – N). It is probable that these individuals escaped from the breeding or were deliberately released into the wild.

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

<input checked="" type="checkbox"/>	the environmental domain
<input checked="" type="checkbox"/>	the cultivated plants domain
<input checked="" type="checkbox"/>	the domesticated animals domain
<input checked="" type="checkbox"/>	the human domain
<input checked="" type="checkbox"/>	the other domains

acommm05.	Comments:
	Coati can potentially affect the natural environment both by predation on native species of animals and by competing for resources with other species. The only place where the coati has been found to have a negative impact on the native fauna are the islands of Robinson Crusoe and Juan Fernandez in the Pacific (Gompper and Decker 1998 – P). Coati is a vector of numerous pathogens and parasites, some of which may pose a threat to humans (Herrera et al. 2002, 2008 – P). Coati can destroy both plant crops, feeding in orchards and gardens, as well as fruit and vegetable crops (Perez and Pacheco 2006 – P), which at high densities leads to conflicts with humans. Potentially, it can cause damage to maize and potato crops (Perez and Pacheco 2006 – P). In addition, in places with high tourist traffic, where animals are semi-domesticated, cases of coati aggression have been reported towards people, especially children (Bittner et al. 2010 – P). In anthropogenic environments, coati can cause damage to the infrastructure.

## 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* to 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 Polish territory is:

<input checked="" type="checkbox"/>	low
<input type="checkbox"/>	medium
<input type="checkbox"/>	high

aconf02.	Answer provided with a	low	medium	high	level of confidence
				<b>X</b>	

acomment06. Comments:  
The natural range of this species includes South America (Gompper and Decker 1998 – P). There are no wild populations of this species in the countries neighboring to Poland. There is no possibility of independent expansion to Europe. In Europe, this species was introduced to Majorca (Mayol et al. 2009, Valenzuela and Alcovar 2013 – P.).

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

<input checked="" type="checkbox"/>	low
<input type="checkbox"/>	medium
<input type="checkbox"/>	high

aconf03.	Answer provided with a	low	medium	high	level of confidence
				<b>X</b>	

acomment07. Comments:  
Accidental and unintentional introduction of this species is impossible. There is no possibility of transporting this species as a result of unintentional human activities.

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

<input type="checkbox"/>	low
<input checked="" type="checkbox"/>	medium
<input type="checkbox"/>	high

aconf04.	Answer provided with a	low	medium	high	level of confidence
				<b>X</b>	

acomment08. Comments:  
Coati are not bred on farms in Poland and Europe, and they are very rarely raised as companion animals. Individuals of this species, including the young from breeding, are available on an online sale in Europe and in Poland. Theoretically, there is a risk of escapes or deliberate release of animals by humans, however, the probability of survival, or reproduction of this species in the wild in Poland is minimal. Individuals that escaped from private breeding may appear in the environment (Solarz W. unpublished data – N), but because they are usually single, they do not form a population. There were two cases in Poland: in autumn 2008, 3-4 individuals near Krakow (observed by M. Klejdysz) and in 2014 in Warsaw (W. Solarz unpublished data – N). In the United Kingdom (Cumbria), in the years 2003-2007, single individuals of coati were found at large (released by humans or escaped from breeding), however, no cases of reproduction were reported (Edgeworth A. 2010 – I). Coati have also been introduced in Mallorca, where a small population (family group and individuals) has been observed since 2003 (Mayol et al. 2009 – P). The place of introduction,

where coati reproduced in the wild and formed quite a large population, are the islands of Robinson Crusoe and Juan Fernandez in the Pacific (Gompper and Decker 1998 – P). Intense trade in these animals can increase the likelihood of escapes or people letting coati. However, the threat of creating a wild population is very small.

## 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 a **climate** that is:

- non-optimal  
 sub-optimal  
 optimal for establishment of *the species*

aconf05. Answer provided with a 

low	medium	high <b>X</b>
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 level of confidence

acomm09. Comments:  
 The natural geographical range of the coati includes the tropical and subtropical zone of South America (Gompper and Decker 1998 – P). It is a thermophilic species that is unable to survive in the wild in a temperate climate zone. Climatic conditions (especially in winter) make it impossible to introduce and settle this species in Poland.

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

- non-optimal  
 sub-optimal  
 optimal for establishment of *the species*

aconf06. Answer provided with a 

low	medium	high <b>X</b>
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 level of confidence

acomm10. Comments:  
 In its natural range, coati inhabits various forest environments (Goulart et al. 2009, Desbiez and Borges 2010 – P). The food of these animals are primarily fruits and invertebrates (Alves-Costa et al. 2004, Beisiegel and Mantovani 2006, Hirsch 2009 – P). The young are born in October-November (Beisiegel 2001 – P). Coati, as a thermophilic species, is not able to survive low temperatures, especially young individuals that are born in October-November. In Poland, there are no appropriate conditions that would allow this species to survive in the wild and reproduce, especially in the winter half-year.

## A3 | Spread

Questions from this module assess the risk of *the species* to overcoming dispersal barriers and (new) environmental barriers within Poland. This would lead 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 to be 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

aconf07. Answer provided with a 

low	medium	high <b>X</b>
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 level of confidence

acommm11. Comments:  
 Estimation (data type: C)  
 There is no wild population in the countries neighboring Poland. However, if such populations arise, the spread of coati to the territory of Poland will not be possible due to unfavorable climatic conditions for this species. In Europe, the coati were introduced in Majorca (Mayol et al. 2009, Valenzuela and Alcover 2013 – P). Currently, this species does not spread to other areas of Europe from there. The size of the areas varies from 0.4 to 22 km<sup>2</sup> (Haas 2002, Beisiegel and Mantovani 2006, Trovati et al. 2010 – P), in which case the pace of colonization can be relatively high if environmental conditions (especially climatic conditions) allow it.

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

- low
- medium
- high

aconf08. Answer provided with a 

low	medium	high <b>X</b>
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 level of confidence

acommm12. Comments:  
 Bringing to farms in homes, private zoos and online commerce, and then their escapes or release of individuals into the wild are the only ways to introduce this species in Poland. Transport and the spread of this species in Poland with the participation of man is therefore possible, but rather on a small scale, which poses a small threat of penetration into the new areas of Poland. A rise in the number of imported individuals increases the probability of this species appearing in the environment and the spread of the species with the human participation.

## A4a | Impact on the 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 species. 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 at a local scale: limited decline is considered as a (mere) drop in numbers; severe decline is considered as (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
- medium
- high

aconf09.	Answer provided with a	low	medium	high	level of confidence
		<b>X</b>			

acommm13. Comments:  
 The composition of the coati diet is very diverse, however, fruits and invertebrates are the main food ingredients of these animals (Alves-Costa et al. 2004, Hirsch 2009, Aguiar et al. 2011 – P). In Argentina and Brazil, coati ate the fruits of 29 and 53 plant species, respectively (Alves-Costa and Eterovick 2007, Hirsch 2009 – P). In the Iguazu National Park, the coati diet consisted mainly of fruits and invertebrates (Hirsch 2009 – P). Vertebrates are generally a small part of the diet of these predators (Alves-Costa et al. 2004 – P). However, other studies have shown a greater proportion of vertebrates in the coati food. In Southeastern Brazil, the share of vertebrates in the diet was as follows: mammalian remains were found in 41% of faeces, birds in 21%, reptiles in 9% and amphibians in 14% (Ferreira et al. 2013 – P). In this area, the coati also ate a significant amount of anthropogenic food (14%). Although the number of publications on the coati food is small, they indicate high food plasticity of this species and suggest that when introducing coati into a new environment, these animals can quickly adapt to local conditions and by predation they may have a negative impact on native fauna. Because coati are arboreal, they can eat eggs and bird chicks, lowering the breeding success of these animals and affecting the population size. The analysis of diet composition in some areas showed that egg shells were found in 10% of faeces (Ferreira et al. 2013 – P). Since the share of birds' eggs in the predator diet is usually very underestimated (due to the absence of debris from this type of food in the feces), the results indicate that birds' eggs can be eaten by coati in significant quantities. In the case of high population density of this predator, reaching up to 16 individuals per 1 km<sup>2</sup> (Desbiez et al. 2010 – P), the impact of coati on the breeding success of birds can be very large. This is confirmed by bird studies on the island of Robinson Crusoe (Chile), where coati was introduced. These predators had a negative impact on the population size of several species of birds inhabiting this island (Lever 1995 – P). These observations indicate that coati may significantly affect the number of victims in the introduced areas. In Poland, the appearance of this species may probably cause a drop in the number of birds inhabiting forest environments (from *Fringilla coelebs* and *Turdus merula* blackbird to rare species, such as collared flycatcher *Ficedula albicollis*). It is impossible to assess on which species the coati will exert the greatest pressure.

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

<input type="checkbox"/>	low
<input checked="" type="checkbox"/>	medium
<input type="checkbox"/>	high

aconf10.	Answer provided with a	low	medium	high	level of confidence
		<b>X</b>			

acommm14. Comments:  
 It is difficult to determine the impact of the introduction of this species on native species of predators as a result of competition. There is no data on competitive interactions between this species and other predators in its natural range. Due to its arboreal lifestyle, it is not possible to rule out the negative effect on pine martens *Martes martes*.

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

<input checked="" type="checkbox"/>	no / very low
<input type="checkbox"/>	low
<input type="checkbox"/>	medium
<input type="checkbox"/>	high
<input type="checkbox"/>	very high

aconf11.	Answer provided with a	low	medium	high	level of confidence
				<b>X</b>	

acom15.

Comments:

There is no risk of hybridization, because coati is not closely related to native species of predatory mammals inhabiting Europe. The natural range of the Procyonidae family is limited to North, Central and South America (Ewer 1998 – P).

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

<input type="checkbox"/>	very low
<input type="checkbox"/>	low
<input type="checkbox"/>	medium
<input type="checkbox"/>	high
<input checked="" type="checkbox"/>	very high

aconf12.

Answer provided with a

low	medium	high <b>X</b>
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level of confidence

acom16.

Comments:

Like many predators, coati carry many pathogens and parasites. *Toxoplasma gondii* (Thoisy et al 2003 – P) was found in their natural range. In 40% of coati, protozoa of the genus *Encephalitozoon* and *Enterocytozoon* (Lallo et al. 2012 – P) have been reported that can be transmitted to other wild and domestic animals and humans. Some of these species can cause serious diseases in man, as well as domestic and farm animals (e.g. dogs or pigs). *Trypanosoma cruzi*, causing parasitic Chagas disease, and *Mycobacterium bovis* responsible for tuberculosis in cattle (Murakami et al. 2012 – P) were also found in the coati (Herrera et al. 2008 – P). There were also 17 species of intestinal parasites, including *Toxocara*, *Tenia* and *Uncinaria* (Orihel 1964, Vieira et al. 2008 – P). Coati, as well as the related white-nosed coati *Nasua narica*, are rabies transmission vectors (Kreb et al. 2003 – P). At high density, which can potentially be achieved by coati (16 individuals per 1 km<sup>2</sup>, Desbiez and Borges 2010 – P), the transfer of these pathogens and parasites can pose a very significant threat to animals.

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

<input checked="" type="checkbox"/>	low
<input type="checkbox"/>	medium
<input type="checkbox"/>	high

aconf13.

Answer provided with a

low	medium	high <b>X</b>
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level of confidence

acom17.

Comments:

The species does not affect abiotic factors.

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

<input type="checkbox"/>	low
<input checked="" type="checkbox"/>	medium
<input type="checkbox"/>	high

aconf14.

Answer provided with a

low	medium <b>X</b>	high
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level of confidence

acom18.

Comments:

Under optimal conditions, Coati can occur in high densities (up to 16 individuals per 1 km<sup>2</sup>, Desbiez and Borges 2010 – P). In this situation, densely arranged latrines can be a source of parasitic infections, especially in rodents and small bird species, feeding on the seeds of plants found in the excrement of these predators. An increase in the level of parasitic infection may cause a decrease in the number of these species. However, there is no data to support such assumptions. In Poland, the introduction of coati could cause changes in forest ecosystems, influencing changes in the species composition of the bird complex and

through the trophic cascade affect other groups of organisms, e.g. insects. However, it is difficult to predict the directions of these changes.

## A4b | Impact on the cultivated plants domain

Questions from this module qualify the consequences of *the species* for 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 plant targets through **herbivory or parasitism** is:

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

aconf15. Answer provided with a 

low	medium	high X
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 level of confidence

acomm19. Comments:  
Because a large part of the coati diet are plants, they can cause losses in plant crops and fruit harvest. In the natural range (in Bolivia), the coati caused losses mainly in the corn and yucca harvest, where this species was present in up to 80% of the fields (Perez and Pacheco 2006 – P). However, it is not described how large losses were caused by coati. The authors noticed that losses caused by other species of mammals are smaller on fenced fields, but fences did not limit the negative impact of coati. Coati also cause losses in crops inside home gardens (Hass 2002 – P).

**a20.** The effect of *the species* on cultivated plant targets through **competition** is:

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

aconf16. Answer provided with a 

low	medium	high
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 level of confidence

acomm20. Comments:  
The species is an animal, so it has no ability to compete with plants.

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

- inapplicable
- no / very low
- low
- medium
- high
- very high

aconf17. Answer provided with a 

low	medium	high
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 level of confidence

acomm21. Comments:  
The species is an animal, so it has no ability to cross with plants.

**a22.** The effect of *the species* on cultivated plant targets by **affecting the cultivation system’s integrity** is:

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

aconf18. Answer provided with a 

low	medium <b>X</b>	high
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 level of confidence

acomm22. Comments:  
So far, there is no information on the impact of coati on crop cultivation by disturbing their integrity.

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

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

aconf19. Answer provided with a 

low	medium	high <b>X</b>
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 level of confidence

acomm23. Comments:  
There is no information on the impact of coati on plant crops as a host or vector of pathogens and parasites harmful to these plants.

## A4c | Impact on the 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

aconf20. Answer provided with a 

low	medium <b>X</b>	high
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 level of confidence

acomm24. Comments:  
There is no data on the impact of coati on animal production through predation. It can be expected that this species can cause losses on poultry farms.

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

aconf21. Answer provided with a 

low	medium <b>X</b>	high
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 level of confidence

acomm25. Comments:  
Under threat, coati can be aggressive towards dogs or cats, with the consequent bites, but no publications about such behaviors have been found.

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

aconf22. Answer provided with a 

low	medium	high <b>X</b>
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 level of confidence

acomm26. Comments:  
Coati are a vector of transferring many pathogens causing diseases in farm animals and reducing animal production. Coati transfer *Toxoplasma gondii* protozoa, causing toxoplasmosis (de Thoisy et al. 2003 – P) and *Mycobacterium bovis* bacteria responsible for tuberculosis in cattle (Murakami et al. 2012 – P). In 40% of coati, protozoa of the genus *Encephalitozoon* and *Enterocytozoon* (Lallo et al. 2012 – P) have been found that can be transmitted to other species of domestic animals. Some of these species can cause serious diseases in domestic and farm animals (e.g. dogs or pigs). Coati is also a vector of rabies transmission (Kreb et al. 2003 – P), which is subject to the notification obligation based on veterinary regulations (OIE list).

## A4d | Impact on the 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
- vert high

aconf23. Answer provided with a 

low	medium	high
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 level of confidence

acomm27. 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

aconf24. Answer provided with a 

low	medium	high <b>X</b>
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 level of confidence

acomm28. Comments:  
Coati may be aggressive and may bite (Bittner et al. 2010 – P). Especially when they adapt to human presence, they use leftovers left in garbage cans or on tables in restaurants (M. Brzeziński – own observation – A), then they become aggressive towards people.

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

aconf25. Answer provided with a 

low	medium	high <b>X</b>
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 level of confidence

acomm29. Comments:  
Coati can transmit dangerous pathogens to humans. For example, they carry *Clostridium difficile* (Silva et al. 2014 – P) causing, among others, enteritis in humans, protozoa from the genus *Encephalitozoon* and *Enterocytozoon* (Lallo et al. 2012 – P), which can cause microsporidiosis in humans or flagellate of the genus *Leishmania* (Lainson et al. 1989 – P) responsible for leishmaniasis. In the coati, *Trypanosoma cruzi* was also found, which causes parasitic Chagas disease in humans (Herrera et al. 2008, Rocha et al. 2013 – P). Coati are also a rabies vector (Kreb et al. 2003 – P), a disease which is deadly for humans and subject to reporting (OIE list).

## 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

aconf26. Answer provided with a 

low	medium <b>X</b>	high
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 level of confidence

acomm30.

Comments:

In some places of their natural range coati feed near human settlements (M. Brzeziński – own observation – A), where they can scatter litter, destroy crops in home gardens or greenhouses (Sazima 2010 – P). In some places, near restaurants, they beg for food.

### 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

aconf27.

Answer provided with a

low	medium	high <b>X</b>	level of confidence
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acomm31.

Comments:

Coati may have a negative impact on services related to providing food by feeding in orchards and gardens, which may negatively affect the production of fruits and vegetables. The transmission of diseases and parasites by this species to livestock may in turn have a negative effect on animal production. However, it is difficult to assess this impact and its potential scale.

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

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

aconf28.

Answer provided with a

low	medium	high <b>X</b>	level of confidence
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acomm32.

Comments:

The presence of coati in ecosystems may result in higher prevalence of zoonoses, including rabies, which it is a carrier of.

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

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

aconf29.

Answer provided with a

low	medium	high <b>X</b>	level of confidence
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acomm33.

Comments:

In some places, coati may feed in urbanized areas, constituting a nuisance element e.g. in restaurants serving meals outside the building. Individuals of this species can also spread waste, seeking food in garbage containers.

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

Below, each of the Harmonia<sup>+PL</sup> modules is revisited under the premise of the future climate. The proposed time horizon is the mid-21st century. We suggest taking into account the reports of the Intergovernmental Panel on Climate Change. Specifically, the expected changes in 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

aconf30.

Answer provided with a

low	medium	high
		<b>X</b>

level of confidence

acomm34.

Comments:

Climate warming will not have an effect on overcoming of geographical barriers. The climate changes predicted based on the current models will still not allow for the introduction of this species to Poland, the temperature would have to increase significantly, which is very unlikely.

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

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

aconf31.

Answer provided with a

low	medium	high
		<b>X</b>

level of confidence

acomm35.

Comments:

Significant global warming may cause the coati to create a wild population and reproduce in Poland. However, average temperatures, especially in winter, would have to increase significantly, and such a scenario of global warming is still unlikely

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

- decrease significantly
- decrease moderately
- not change

- increase moderately
- increase significantly

aconf32. Answer provided with a 

low	medium	high <b>X</b>
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 level of confidence

acomm36. Comments:  
Scenarios of global warming do not assume that temperatures will rise to such an extent as to enable the spread of this species in Poland.

**a37. IMPACT ON THE 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

aconf33. Answer provided with a 

low	medium <b>X</b>	high
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 level of confidence

acomm37. Comments:  
It is difficult to assess whether global warming can change the impact of this species on the environment. Especially that the probability of creating a wild population in Poland is very small.

**a38. IMPACT ON THE 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
- increase moderately
- increase significantly

aconf34. Answer provided with a 

low	medium <b>X</b>	high
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 level of confidence

acomm38. Comments:  
The climate change will not increase the impact of this species on crops.

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

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

aconf35. Answer provided with a 

low	medium <b>X</b>	high
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 level of confidence

acomm39. Comments:  
The potential impact of coati on animal husbandry is small and is not dependent on the climate change.

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

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

aconf36. Answer provided with a 

low	medium <b>X</b>	high
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 level of confidence

acomm40. Comments:  
The potential impact of coati on other people is not dependent on the 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

aconf37. Answer provided with a 

low	medium <b>X</b>	high
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 level of confidence

acomm41. Comments:  
The potential impact of coati on other objects is not dependent on the climate change.

## Summary

Module	Score	Confidence
Introduction (questions: a06-a08)	0.17	1.00
Establishment (questions: a09-a10)	0.00	1.00
Spread (questions: a11-a12)	0.00	1.00
Environmental impact (questions: a13-a18)	0.42	0.58
Cultivated plants impact (questions: a19-a23)	0.17	0.83
Domesticated animals impact (questions: a24-a26)	0.42	0.67
Human impact (questions: a27-a29)	0.63	1.00
Other impact (questions: a30)	0.00	0.50
Invasion (questions: a06-a12)	0.06	1.00
Impact (questions: a13-a30)	0.63	0.72
Overall risk score	0.03	
Category of invasiveness	moderately invasive alien species	

## A6 | Comments

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

acom42.

Comments:

Although the calculated value of the negative effect of coati (0.63) classifies it as the medium invasive alien species, the total score (0.03) indicates the lack of real threat from this species in Poland. Such an assessment results from the very low likelihood of introducing, settling in and spreading of the coati in Poland (the total score for the invasion process is only 0.06).

## Data sources

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## 2. Databases (B)

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## 3. Unpublished data (N)

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## 4. Other (I)

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## 5. Author's own data (A)

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