

Black-crowned night heron (*Nycticorax nycticorax*)

- Ornamental bird with a wide native range.
- Commonly kept in private collections, also a natural vagrant to GB from Europe.
- Currently expanding its native range in western Europe northwards so may spread to GB naturally.
- A breeding colony of around 60 individuals previously existed in Edinburgh but recent data only recorded one bird in GB.
- Predator of amphibians, fish, and chicks and eggs of other birds, however impacts are unlikely to be greater than those caused by the native grey heron.
- Potential agricultural pest.



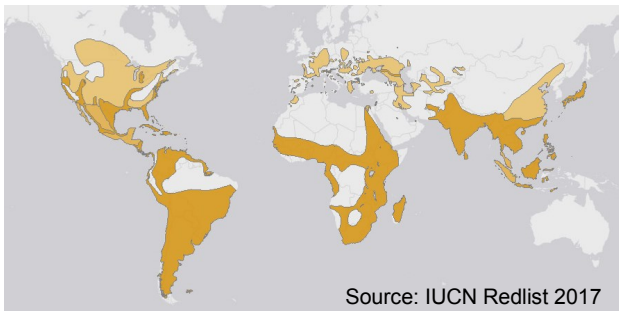
Dick Daniels, Wikimedia Commons 2017

History in GB

A natural vagrant to GB from its native range in mainland Europe, and annual records are likely to be mostly natural vagrants. However, all breeding records in GB are connected to birds originating in captive collections. The first record of night herons in the wild in GB was from Northamptonshire in 1887 when two young birds were deliberately released. A breeding colony at Edinburgh Zoo was active from 1938 to 2000 and the birds allowed to fly freely from 1950 onwards. At its peak in 1968, this population held around 60 individuals but was eradicated in 2004. Another breeding colony in Norfolk was established by birds that escaped from a local collection but breeding has not been recorded here or elsewhere in GB since 2003. Recent (2014-15) BTO data recorded a single bird in GB.

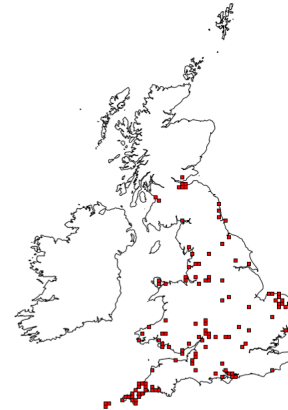
Native distribution

North and South America, much of Africa, southern Eurasia from Morocco and the Netherlands east to Japan, the Philippines and the Lesser Sundas.



Source: IUCN Redlist 2017

Distribution in GB (map shows sightings, not established populations)



Source: NBN 2017

Impacts

Environmental (minor)

- Feeds on amphibians, and chicks and eggs of other birds, although impacts are unlikely to be greater than those caused by the native Grey heron.

Economic (minimal)

- Has caused losses at aquaculture ponds within its native range due to predation on fish.

Social (minimal)

- Potential vector for avian influenza, but unlikely to be a significant risk.

Introduction pathways

Ornamental - commonly kept in captivity, escapes of captive birds have previously led to feral breeding colonies.

Spread from European populations - currently expanding its native range in western Europe northwards, possibly as a result of a warming climate, and may spread to GB naturally.

Spread pathways

Natural (slow) - natural expansion of this species' European range has been relatively gradual.

Human-aided (slow) - possible future escapes from captivity could lead to the spread of this species, but individuals at previously established colonies in GB remains relatively localised.

Summary

	Risk	Confidence
Entry	VERY LIKELY	VERY HIGH
Establishment	LIKELY	HIGH
Spread	SLOW	HIGH
Impacts	MINIMAL	HIGH
Conclusion	LOW	HIGH

Information about GB Non-native Species Risk Assessments

The Convention on Biological Diversity (CBD) emphasises the need for a precautionary approach towards non-native species where there is often a lack of firm scientific evidence. It also strongly promotes the use of good quality risk assessment to help underpin this approach. The GB risk analysis mechanism has been developed to help facilitate such an approach in Great Britain. It complies with the CBD and reflects standards used by other schemes such as the Intergovernmental Panel on Climate Change, European Plant Protection Organisation and European Food Safety Authority to ensure good practice.

Risk assessments, along with other information, are used to help support decision making in Great Britain. They do not in themselves determine government policy.

The Non-native Species Secretariat (NNSS) manages the risk analysis process on behalf of the GB Programme Board for Non-native Species. Risk assessments are carried out by independent experts from a range of organisations. As part of the risk analysis process risk assessments are:

- Completed using a consistent risk assessment template to ensure that the full range of issues recognised in international standards are addressed.
- Drafted by an independent expert on the species and peer reviewed by a different expert.
- Approved by an independent risk analysis panel (known as the Non-native Species Risk Analysis Panel or NNRAP) only when they are satisfied the assessment is fit-for-purpose.
- Approved for publication by the GB Programme Board for Non-native Species.
- Placed on the GB Non-native Species Secretariat (NNSS) website for a three month period of public comment.
- Finalised by the risk assessor to the satisfaction of the NNRAP.

To find out more about the risk analysis mechanism go to: www.nonnativespecies.org

Common misconceptions about risk assessments

To address a number of common misconceptions about non-native species risk assessments, the following points should be noted:

- Risk assessments consider only the risks posed by a species. They do not consider the practicalities, impacts or other issues relating to the management of the species. They therefore cannot on their own be used to determine what, if any, management response should be undertaken.
- Risk assessments are about negative impacts and are not meant to consider positive impacts that may also occur. The positive impacts would be considered as part of an overall policy decision.
- Risk assessments are advisory and therefore part of the suite of information on which policy decisions are based.
- Completed risk assessments are not final and absolute. Substantive new scientific evidence may prompt a re-evaluation of the risks and/or a change of policy.

Period for comment

Draft risk assessments are available for a period of three months from the date of posting on the NNSS website*. During this time stakeholders are invited to comment on the scientific evidence which underpins the assessments or provide information on other relevant evidence or research that may be available. Relevant comments are collated by the NNSS and sent to the risk assessor. The assessor reviews the comments and, if necessary, amends the risk assessment. The final risk assessment is then checked and approved by the NNRAP.

*risk assessments are posted online at: <http://www.nonnativespecies.org/index.cfm?pageid=143>
comments should be emailed to nnss@apha.gov.uk

GB Non-native Species Rapid Risk Assessment (NRRAP)

Rapid Risk Assessment of: *Nycticorax nycticorax* (Night heron)

Author: Rebecca Jones, Animal and Plant Health Agency (APHA)

Version: Draft 1 (*March 2012*), Peer Review (*March 2013*), NNRAP 1st review (*Oct 2013*), Draft 2 (*Nov 2016*)

Signed off by NNRAP: November 2016

Approved by Programme Board: June 2019

Placed on NNS website: TBC

Introduction:

The rapid risk assessment is used to assess invasive non-native species more rapidly than the larger GB Non-native Risk Assessment. The principles remain the same, relying on scientific knowledge of the species, expert judgement and peer review. For some species the rapid assessment alone will be sufficient, others may go on to be assessed under the larger scheme if requested by the Non-native Species Programme Board.

Guidance notes:

- We recommend that you read all of the questions in this document before starting to complete the assessment.
- Short answers, including one word answers, are acceptable for the first 10 questions. More detail should be provided under the subsequent questions on entry, establishment, spread, impacts and climate change.
- References to scientific literature, grey literature and personal observations are required where possible throughout.

1 - What is the principal reason for performing the Risk Assessment? (Include any other reasons as comments)

Response: To rapidly assess the risk associated with this species in Great Britain. The Night heron was identified by a GB horizon scanning exercise as a 'medium risk species either present, enclosed, or absent in Great Britain' (Parrot et al., 2009)

2 - What is the Risk Assessment Area?

Response: Great Britain

3 - What is the name of the organism (scientific and accepted common; include common synonyms and notes on taxonomic complexity if relevant)?

Response: *Nycticorax nycticorax* (Black-crowned night heron or Night heron)
Four subspecies: *N. n. nycticorax* (Eurasia, Africa), *N. n. hoactli* (Americas), *N. n. obscurus* (Chile, Argentina), *N. n. falklandicus* (Falklands)

4 - Is the organism known to be invasive anywhere in the world?

Response: The picture is complex – birds are known to have escaped from captivity in the Netherlands and bred successfully there (Erhart & Kurstjens, 2000). However, the species is native in much of Europe – its native breeding range includes France and Germany, and extends as far North as the Netherlands (BirdLife, 2016; IUCN, 2016). There are therefore both native birds and feral birds breeding in the Netherlands, with the origin of individuals often being unclear (Waarneming, 2016; Sovon, 2016). Since the species is generally migratory, it is thought that birds overwintering in the Netherlands are of captive origin (Sovon, 2016). However, native birds in France have been overwintering more and more regularly (INPN, 2016). Populations in both France and the Netherlands are increasing, and the species is expanding its native range northwards following a similar pattern of expansion to that of the Little egret (*Egretta garzetta*) (Erhart & Kurstjens, 2000). Therefore, although escaped birds are known to have established breeding colonies in north western Europe, it is difficult to tell the origin of individual birds and thus to establish an accurate picture of the population trend in feral birds.

5 - What is the current distribution status of the organism with respect to the Risk Assessment Area?

Response: The species is a natural vagrant to GB from its native range in mainland Europe, and annual records are likely to be mostly natural vagrants (Parkin & Knox, 2010). However, all breeding records in GB are connected to escapes from captive collections that have led to temporary breeding populations. Birds of the *hoactli* subspecies escaped from Edinburgh zoo in 1951 and established a breeding colony nearby where they bred until 2004, when they were eradicated (Parkin & Knox, 2010). Another breeding colony in Norfolk was established by birds that escaped from a local collection, but breeding has not been recorded here or anywhere in GB since 2003 (Holling et al., 2014, Holling et al., 2011; Balmer et al., 2013; Parkin & Knox, 2010; Banks et al, 2008). BTO WEBS data for the winter of 2014-2015 shows a maximum of 1 bird (BTO, 2016). Therefore, although the bird is clearly capable of breeding in GB, it does not currently do so. However, there is the continued possibility of escapes from captive collections, and given that natural vagrants occur yearly and given the northward expansion of its native range in northwest Europe, there is a strong likelihood of the species breeding in GB in the future. If it colonises GB through a natural expansion of its native range, it could no longer be classed as a non-native species.

6 - Are there conditions present in the Risk Assessment Area that would enable the organism to survive and reproduce? Comment on any special conditions required by the species?

Response: Yes. The Night heron naturally inhabits a wide variety of wetland habitats, ranging from saline to fresh water, and open to wooded areas. It has been known to forage and breed in relatively urban areas. It nests in trees or aquatic vegetation near water, either singly or in colonies, and has been known to nest alongside other heron species such as the native Grey heron (*Ardea cinerea*) (BirdLife, 2016; Bernick, 2007; Erwin et al., 1990)

It is an opportunistic feeder with a wide range of prey including fish, frogs, tadpoles, adult and larval insects, earthworms, spiders, crustaceans, molluscs, leeches, small rodents, carrion and the eggs and chicks of other bird species (BirdLife, 2016; Bernick, 2007).

Suitable habitats and breeding sites are plentiful in GB.

7 - Does the known geographical distribution of the organism include ecoclimatic zones comparable with those of the Risk Assessment Area or sufficiently similar for the organism to survive and thrive?

Response: Yes. The Night heron's native range extends into north western Europe as far north as the Netherlands, where the population is increasing. Its native range is also expanding northwards, possibly in response to a warming climate (INPN, 2016; Huntley et al., 2007; Erhart & Kurstjens, 2000). The species has also previously bred successfully in GB, in captivity and as an escaped feral species (Holling et al., 2014; Huntley et al., 2007; Banks et al., 2008).

8 - Has the organism established viable (reproducing) populations anywhere outside of its native range (answer N/A if you have answered 'yes' to question 4)?

Response: N/A

9 - Can the organism spread rapidly by natural means or by human assistance?

Response: Yes. The species is highly mobile, being both migratory and dispersive in its native range. It is therefore capable of moving to find new suitable feeding and breeding areas. The species is currently expanding its native range in western Europe northwards, possibly as a result of a warming climate, and may spread to GB naturally (INPN, 2016; Huntley et al., 2007; Erhart & Kurstjens et al., 2000). It is also commonly kept in captivity, and escapes of captive birds are known and have led to feral breeding colonies (Banks et al., 2008).

10 - Could the organism itself, or acting as a vector, cause economic, environmental or social harm in the Risk Assessment Area?

Response: Night herons have been known to cause losses at aquaculture ponds due to predation on fish within its native range in the US and Israel (Spanier 1980; Davis 1993).

Night herons are also known to feed on the eggs and chicks of other birds. There is evidence that, in the US, Night herons predate tern chicks and eggs and can cause adult birds to abandon nests through disturbance (Spendelow & Kuter, 2004; Shealer & Kress, 1991; Hunter & Morris, 1976; Collins, 1970). At some colonies, this has contributed to poor breeding success. At one Roseate tern (*Sterna dougallii*) colony in the US, predation and disturbance by Night herons was largely responsible for a 50% decline in the breeding

population in a five-year period (Spendelow & Kuter, 2004). A study on the diet of Night herons at a US colony found that 28% of regurgitates contained bird remains, including remains from Common tern (*Sterna hirundo*), Common eider (*Somateria mollissima*), gulls and waders (Scott-Hall & Kress, 2008). Night herons also predate amphibians, and may be a significant predator of frogs (Canvamphibs, 2016).

The species is known to be susceptible to avian influenza (BirdLife, 2016), but unlikely to have a significant effect on the spread of the disease in the UK.

Entry Summary

Estimate the overall likelihood of entry into the Risk Assessment Area for this organism (comment on key issues that lead to this conclusion).

Response: *very likely*
Confidence: *very high*

Comments (include list of entry pathways in your comments): The species is a natural vagrant to GB from its native range in mainland Europe, and there are annual records of what are likely to be natural vagrants (Parkin & Knox, 2010). The species is currently expanding its native range in western Europe northwards, possibly as a result of a warming climate, and may spread to GB naturally (INPN, 2016; Huntley et al., 2007; Erhart & Kurstjens et al., 2000). It is also commonly kept in captivity, and escapes of captive birds are known and have led to feral breeding colonies (Banks et al., 2008).

Establishment Summary

Estimate the overall likelihood of establishment (comment on key issues that lead to this conclusion).

Response: *likely*
Confidence: *high*

Comments (state where in GB this species could establish in your comments, include map if possible): The species has previously established colonies in Norfolk and Scotland following escapes from captivity and breeds readily in captivity in GB (Banks et al., 2008). The conditions required for establishment have therefore been proven to exist in GB, and there is plenty of suitable wetland habitat in GB. The apparent natural northward spread of its native range has led to successfully breeding birds in the Netherlands and it is likely that the species will spread from here to GB. Such a natural spread would likely lead to the species becoming initially established in the southeast of GB. Further escapes also remain possible and are likely to lead to breeding attempts. These could be anywhere where birds are held captive. Records of numbers and locations of captive kept birds are difficult to estimate, as there are no legal requirements to register specimens. A search of an online zoo database (www.zootierliste.de) returned 14 institutions currently holding the nominate subspecies of Night heron in the UK (zootierliste, 2016). This is likely to be a vast under-estimate, as recording is voluntary, and the database is a German one, so institutions outside of Germany although included, are likely to be under-represented.

Spread Summary

Estimate overall potential for spread (comment on key issues that lead to this conclusion).

Overall response: *slow*

Confidence: *high*

Sub scores:

Natural spread only:

Response: *slow*

Confidence: *high*

Human facilitated spread only:

Response: *slow*

Confidence: *medium*

Comments (in your comments list the spread pathways and discuss how much of the total habitat that the species could occupy has already been occupied): The species is currently expanding its native range in western Europe northwards, possibly as a result of a warming climate, and is highly likely to continue this trend and spread to the southeast of GB and from there northwards. This natural expansion appears to be relatively gradual, although climate change may affect this. Possible future escapes from captivity could lead to the species spreading, but individuals at the previously established colonies in GB remained relatively localised. The species does not currently breed in GB, although regular vagrants occur from mainland Europe.

Impact Summary

Estimate overall severity of impact (comment on key issues that lead to this conclusion)

Overall response: *minimal*

Confidence: *high*

Sub-scores

Environmental impacts:

Response: *minor*

Confidence: *medium*

Economic impacts:

Response: *minimal*

Confidence: *high*

Social impacts:

Response: *minimal*

Confidence: *medium*

Comments (include list of impacts in your comments):

Environmental impacts: Night herons are also known to feed on the eggs and chicks of

other birds. There is evidence that, in the US, Night herons predate tern chicks and eggs and can cause adult birds to abandon nests through disturbance (Spendelow & Kuter, 2004; Shealer & Kress, 1991; Hunter & Morris, 1976; Collins, 1970). At some colonies, this has contributed to poor breeding success. At one Roseate tern (*Sterna dougallii*) colony in the US, predation and disturbance by Night herons was largely responsible for a 50% decline in the breeding population in a five-year period (Spendelow & Kuter, 2004). A study on the diet of Night herons at a US colony found that 28% of regurgitates contained bird remains, including remains from Common tern (*Sterna hirundo*), Common eider (*Somateria mollissima*), gulls and waders (Scott-Hall & Kress, 2008). Night herons also predate amphibians, and may be a significant predator of frogs (Canvamphibs, 2016). Such effects are unlikely to be greater than those caused by the native Grey heron (*Ardea cinerea*).

Economic impacts: Night herons have been known to cause losses at aquaculture ponds due to predation on fish within its native range in the US and Israel (Spanier, 1980; Davis, 1993). Such effects are unlikely to be greater than those caused by the native Grey heron (*Ardea cinerea*).

Social impacts: The species is known to be susceptible to avian influenza (BirdLife, 2016) and could potentially be a carrier in the event of an outbreak.

Climate Change

What is the likelihood that the risk posed by this species will increase as a result of climate change?

Response: *high*
Confidence: *high*

Comments (include aspects of species biology likely to be effected by climate change (e.g. ability to establish, key impacts that might change and timescale over which significant change may occur): The species is currently expanding its native range in western Europe northwards, possibly as a result of a warming climate, and is highly likely to continue this trend and spread to the southeast of GB and from there northwards (INPN, 2016; Huntley et al., 2007; Erhart & Kurstjens, 2000). If the climate in GB becomes warmer, it is highly likely to facilitate the northerly spread of this species.

Conclusion

Estimate the overall risk (comment on the key issues that lead to this conclusion).

Response: *very low*
Confidence: *high*

Comments: It is likely that the Night heron will spread naturally to GB as part of an overall northward expansion of its native range, possibly in response to warming climates. The projected impacts to the environment and the economy are low, although control may occasionally be required at specific locations to protect certain native species from predation.

Management options (brief summary):

1 - Has the species been managed elsewhere? If so, how effective has management been?

Response: Night herons have been controlled through shooting at tern colonies in the US to reduce predation pressure (Spendelow & Kuter, 2004).

2 - List the available control / eradication options for this organism and indicate their efficacy.

Response: Control options include destruction of eggs (by pricking, oiling, or replacement) and nests, or lethal control of adults through shooting. Nests are likely to be difficult to access, so egg or nest destruction is likely to be labour intensive and largely ineffective, so shooting of adults is likely to be the most effective method. Since the species is largely nocturnal and secretive, shooting at roosts and at breeding colonies is likely to be most effective.

3 - List the available pathway management options (to reduce spread) for this organism and indicate their efficacy.

Response: There is no way of preventing natural spread through expansion of the species' native range.

Further escapes of captive birds could be reduced through stricter regulations for captive bird collections, marking and registering specimens, and preventing and recording escapes (Callaghan et al., 2006).

4 - How quickly would management need to be implemented in order to work?

Response: As the Night heron does not currently breed in GB, management is not currently required. Control of naturally spreading birds should not be attempted. Should a colony become established by birds of captive origin, it seems likely that spread will be slow, therefore control, although not urgent, is likely to be effective at preventing spread. If such a colony were to become established close to a breeding colony of a vulnerable bird species such as the Roseate (*Sterna dougallii*) or Little tern (*Sternula albifrons*), more urgent control measures might need to be considered.

References

Provide here a list of the references cited in the course of completing assessment

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