B6. Pressure from invasive species

a. Freshwater invasive species

b. Marine (coastal) invasive species

c. Terrestrial invasive species

Type: Pressure Indicator

Summary

There are 3,163 non-native species in Great Britain, 1,980 of which are classified as established (reproducing in the wild).

This indicator contains 190 non-native species that are considered to be exerting a negative impact on native biodiversity (46 freshwater species, 36 marine species and 108 terrestrial species). The majority (184) of these species are established; six[1] are long-term resident but not known to breed in the wild.

Over the period 1960 to 2017, invasive non-native species have become more prevalent in the countryside. Since 1960, the number of these species established in or along 10% or more of Great Britain's land area or coastline has increased in the freshwater, terrestrial and marine (coastal) environments, thereby increasing the likely pressure on native biodiversity.

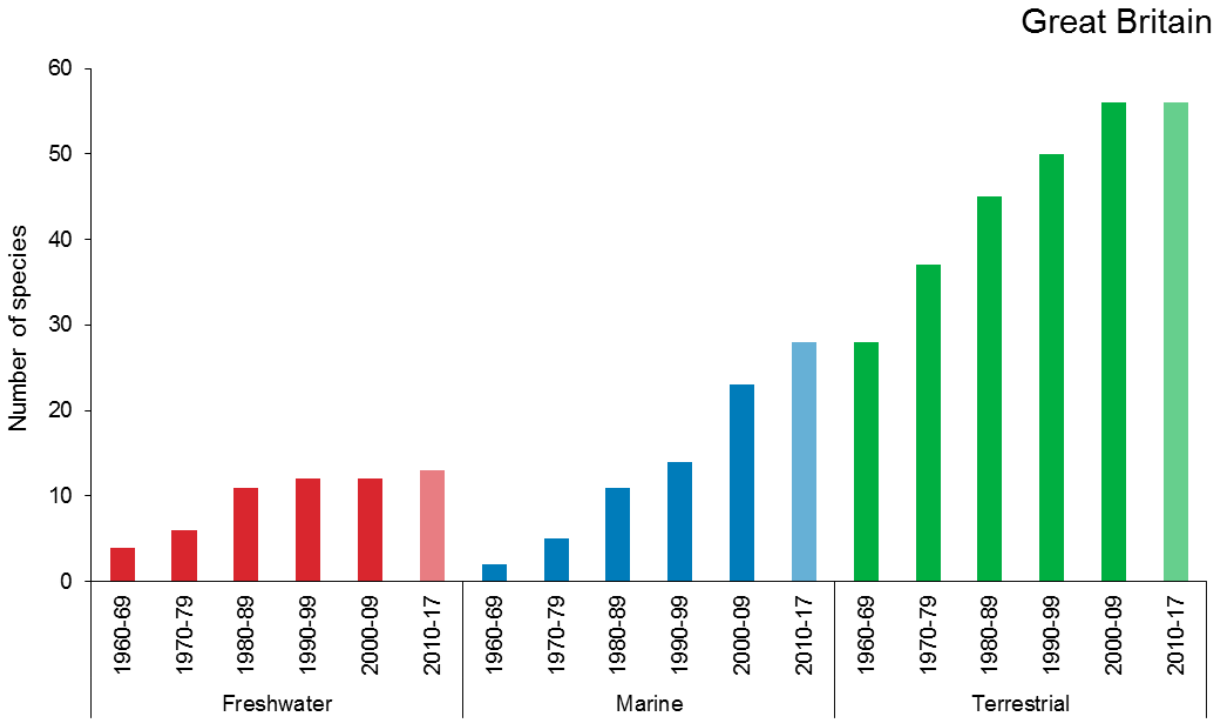
Comparing the latest period (2010 to 2017) with the previous one (2000 to 2009), the number of invasive non-native species established in or along 10% or more of Great Britain's land area or coastline has remained constant in terrestrial environments (at 56 species), and has increased in both freshwater (from 12 to 13 species) and marine environments (from 23 to 28 species).

Indicator Description

Non-native species are those that have reached Great Britain by accidental human transport, deliberate human introduction, or which arrived by natural dispersal from a non-native population in Europe. Species that have arrived since 1500 are included within this indicator. Most non-native species are considered benign or positive but some have a negative impact on native species through the spread of disease, competition for resources, or by direct consumption, parasitism or hybridisation; such species are termed invasive. Invasive non-native species have one or more of these negative impacts and a high capacity to spread to natural and semi-natural habitats. The indicator shows the change in number of invasive non-native species established across 10% or more of the land area of Great Britain, or along 10% or more of the extent of its coastline.

[1] The six long-term resident species included the indicator are two species of terrapin (*Emys orbicularis*, *Trachemys scripta*) and four freshwater fish (*Ameiurus melas*, *Leuciscus idus*, *Salvelinus fontinalis*, *Oncorhynchus gorbuschas*).

Figure B6i. Number of invasive non-native species established in or along 10% or more of Great Britain's land area or coastline, 1960 to 2017.



Notes: The last time period covers a shorter period than the other bars (from 2010 to 2017).

Source: Botanical Society of Britain & Ireland, British Trust for Ornithology, Centre for Ecology & Hydrology, Marine Biological Association, National Biodiversity Network.

Assessment of change in the number of invasive non-native species established in or along 10% or more of Great Britain's land area or coastline			
	Long term	**Short term**	**Latest year**
Freshwater invasive species	1960–2017	Not assessed	Not assessed
Marine (coastal) invasive species	1960–2017	Not assessed	Not assessed
Terrestrial invasive species	1960–2017	Not assessed	Not assessed

Indicator description

The indicator (Figure B6i) shows the change in number of invasive non-native species established across 10% or more of the land area of Great Britain, or along 10% or more of the extent of its coastline. The short-term trend and latest year's change are not assessed.

Relevance

The United Nations Convention on Biological Diversity (CBD) identifies invasive non-native species as a major threat to biodiversity. Many non-native species do not threaten biodiversity but invasive non-native species can spread disease (e.g. signal crayfish *Pacifastacus leniusculus*), modify ecosystems (e.g. rhododendron *Rhododendron ponticum*), drastically reduce populations of native

species (e.g. American mink *Mustela vison*), or hybridise with native species (e.g. ruddy duck *Oxyura jamaicensis*).

Under the CBD, the United Kingdom has an international obligation to address the impacts of invasive non-native species. In 2008, the UK Government published the Invasive Non-native Species Framework Strategy for Great Britain.

Background

The indicator and background charts are based on species distribution data available through the National Biodiversity Network (NBN), supplemented by expert knowledge and in house datasets of the Botanical Society of Britain and Ireland (BSBI), British Trust for Ornithology (BTO), Centre for Ecology & Hydrology (CEH), the Environment Agency (EA) and Marine Biological Association (MBA). Trends in the extent of invasive non-native species, as presented in Figure B6i and B6ii were derived through a 2-stage process. The number of invasive non-native species included within the indicator was substantially expanded from the 49 species used in the indicator published in 2009 (Hill *et al*., 2009). An initial list was derived from the GB Non-native Species Information Portal (GB-NNSIP) (Roy *et al*., 2014) by selecting all non-native species within the database that are noted to have, or potentially have, a negative or strongly negative ecological effect, including all 49 species from the original indicator. This list was subsequently reviewed by experts, species for which there was a high degree of uncertainty with respect to negative impact were removed and new species were added as deemed appropriate. The revised list in 2014 comprised of 179 species, but has been subsequently amended in 2015, 2017 and 2018 to now comprise of 190 species (see technical background document).

Invasive non-native species were categorised according to the extent of the land area or coastline of Great Britain in which they were found in the decades of 1960 to 1969, 1970 to 1979, 1980 to 1989, 1990 to 1999, 2000 to 2009 and the present period of 2010 to 2017 (see Table B6i). The categorisation was achieved by combining assessment of modelled distributions based on data available from the NBN with expert opinion and the use of additional datasets where available (for more details see the technical background document).

Figure B6ii shows the number of species in each decade in each extent category listed in Table B6i. The indicator (Figure B6i) is compiled from those invasive non-native species established in or along 10% or more of Great Britain's land area or coastline (i.e. extent categories 3 and 4).

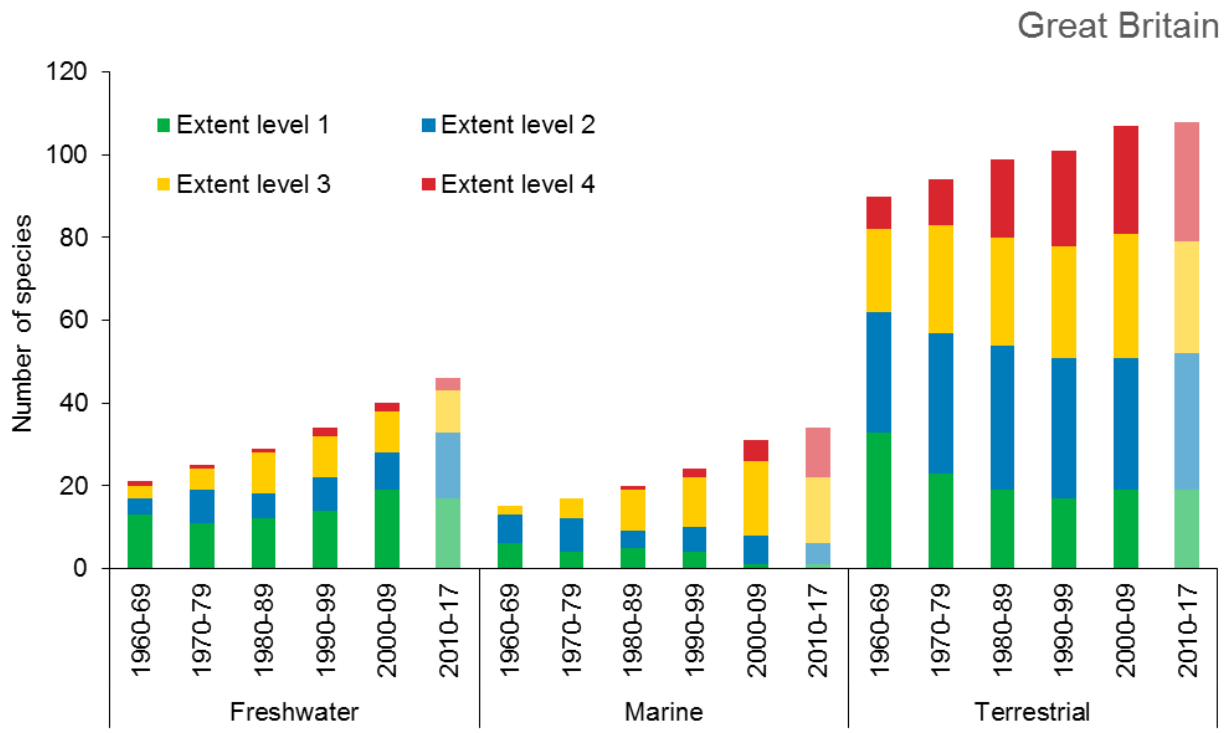
There are limitations to this approach:

- The list of invasive non-native species has been derived through the rapid assessment of impacts based on expert opinion. A semi-quantitative approach is currently being developed to improve the certainty and reliability of the list.
- The extent value is based on relatively broad categories. The extent of some species can increase multifold within a single category, for example, the number of invasive non-native species in 10% to 50% of the land area of Great Britain, which can reduce the sensitivity of the indicator.
- The occurrence data obtained from the NBN may not be representative of the species distribution in each decade, especially for both the earlier and most recent time periods, because there is often a time lag before occurrence data appear on the NBN. Furthermore, the availability of occurrence data reflects the intensity of survey effort applied in a time period that has subsequently been submitted to the NBN. The attribution of extent categories has, however been supplemented by expert opinion and in some cases by more complete datasets.

Table B6i. Invasion extent of non-native species.

Definition	Interpretation	Extent
Not present in territory	Absent	0
Present in territory and either not established or with established populations that have not spread more than 10km from their source	Not or scarcely established	1
Established populations represent less than 10% of territory, with some having arrived from further than 10km from their source; or if more widespread then populations scattered and sparse	Established but still generally absent or at most occasional	2
Established populations present in 10% to 50% of the territory	Established and frequent in part of the territory	3
Established in more than 50% of the territory	Widespread	4

Figure B6ii. Changes in the extent of invasive non-native species in marine (coastal), freshwater and terrestrial environments, 1960 to 2017.



Notes:

1. Extent levels are defined as follows:
    1. Present in territory and either not established or with established populations that have not spread more than 10km from their source.
    2. Established populations represent less than 10% of territory, with some having arrived from further than 10km from their source; or if more widespread then population scattered and sparse.
    3. Established populations present in 10% to 50% of the territory.
    4. Established in more than 50% of the territory.
2. The last time period covers a shorter period than the other bars (from 2010 to 2017).

Source: Botanical Society of Britain and Ireland, British Trust for Ornithology, Centre for Ecology & Hydrology, Marine Biological Association, National Biodiversity Network.

Goals and targets

Aichi Targets for which this is a primary indicator

Strategic Goal B. Reduce the direct pressures on biodiversity and promote sustainable use.

Target 9: By 2020, invasive alien species and pathways are identified and prioritized, priority species are controlled or eradicated, and measures are in place to manage pathways to prevent their introduction and establishment.

Aichi Target for which this is a relevant indicator

None

Web links for further information

Reference	Title	Website
Defra	Developing an indicator of the abundance, extent and impact of invasive non-native species	http://nora.nerc.ac.uk/7796/1/HillN007796CR.pdf (PDF, 382kb)
UK Government	GB Non-native Species Secretariat	http://www.nonnativespecies.org/
UK Government	The Invasive Non-native Species Framework Strategy for Great Britain	https://secure.fera.defra.gov.uk/nonnativespecies/index.cfm?pageid=156
EC 6th Framework Programme	Delivering Alien Invasive Species Inventories for Europe (DAISIE)	http://www.europe-aliens.org/
National Biodiversity Network (NBN)	NBN Atlas	https://nbnatlas.org/
EU Invasive Alien Species	Regulation	https://secure.fera.defra.gov.uk/nonnativespecies/index.cfm?sectionid=78

References

Hill, M.O., Beckmann, B.C., Bishop, J.D.D., Fletcher, M.R., Lear, D.B., Marchant, J.H., Maskell, L.C., Noble, D.G., Rehfisch, M.M., Roy, H.E., Roy, S. & Sewell, J. (2009) Developing an indicator of the abundance, extent and impact of invasive non-native species. Final report. Defra.

Roy, H.E., Preston, C.D., Harrower, C.A., Rorke, S.L., Noble, D., Sewell, J., Walker, K., Marchant, J., Seeley, B., Bishop, J., Jukes, A., Musgrove, A. & Pearman, D. (2014) GB Non-native Species Information Portal: documenting the arrival of non-native species in Britain. *Biological Invasions*, **16**(12), 2495–2505.

Roy, H.E., Rorke, S.L., Beckmann, B., Booy, O., Botham, M.S., Brown, P.M.J., Harrower, C., Noble, D., Sewell, J. & Walker, K. (2015) The contribution of volunteer recorders to our

understanding of biological invasions. *Biological Journal of the Linnean Society*, **115**(3), 678–689.

Full details of this indicator, including a datasheet and technical documentation are available at: http://jncc.defra.gov.uk/page-4246**.**

Last updated: July 2018

Latest data available: 2017