

20. Trends in pressures on biodiversity: invasive species

Type: Pressure Indicator

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.

This 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.

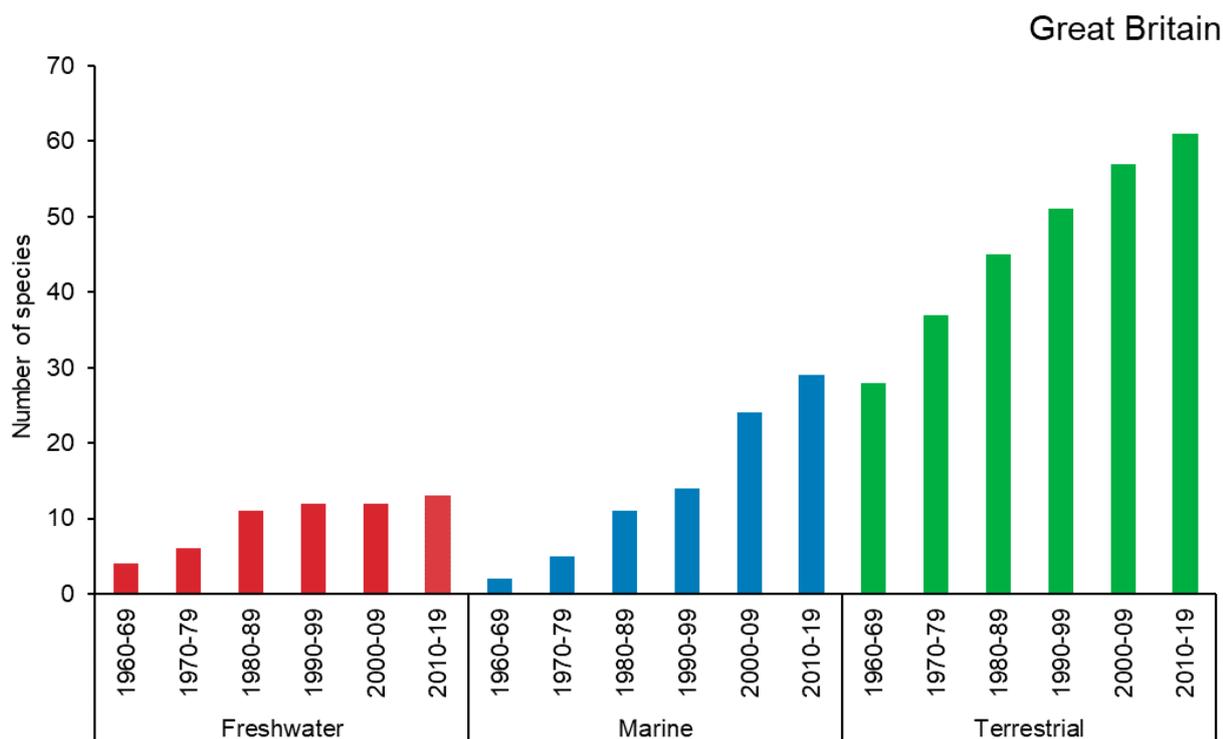
Invasive species in Great Britain

There are 3,224 non-native species in Great Britain, 2,010 of which are classified as established (reproducing in the wild). This indicator contains 193 non-native species that are considered to be exerting a negative impact on native biodiversity (46 freshwater species, 39 marine species and 108 terrestrial species). The majority (187) of these species are established; six¹ are long-term residents but not known to breed in the wild (**Footnote:** The 6 long-term resident species included the indicator are 2 species of terrapin (*Emys orbicularis* and *Trachemys scripta*) and 4 freshwater fish (*Ameiurus melas*, *Leuciscus idus*, *Salvelinus fontinalis* and *Oncorhynchus gorbuchas*).

Over the period 1960 to 2019, 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, marine (coastal) and terrestrial environments, thereby increasing the likely pressure on native biodiversity (Figure 20.1).

¹ The 6 long-term resident species included the indicator are 2 species of terrapin (*Emys orbicularis* and *Trachemys scripta*) and 4 freshwater fish (*Ameiurus melas*, *Leuciscus idus*, *Salvelinus fontinalis* and *Oncorhynchus gorbuchas*).

Figure 20.1: Number of invasive non-native species established in or along 10% or more of Great Britain's land area or coastline, 1960 to 2019



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

Comparing the latest period (2010 to 2019) 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 increased in freshwater environments (from 12 to 13 species) marine environments (from 24 to 29 species) and terrestrial environments (from 57 to 61 species).

Indicator assessment

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

Freshwater invasive species: Long term: (1960 to 2019): Deteriorating; Short term: Not assessed; Latest year: Not assessed.

Marine (coastal) invasive species: Long term: (1960 to 2019): Deteriorating; Short term: Not assessed; Latest year: Not assessed.

Terrestrial invasive species: Long term: (1960 to 2019): Deteriorating; Short term: Not assessed; Latest year: Not assessed.

Note: Analysis of the underlying long-term trends is carried out by the data providers – see [Assessing Indicators](#). Short-term trends and latest-year changes are not assessed.

Indicator description

The indicator (Figure 20.1) 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 indicator shows progress with commitments to improve the status of our wildlife and habitats. It is relevant to outcomes 1, 2 and 3 in [Biodiversity 2020: A strategy for England's wildlife and ecosystem services](#); it is also relevant to a number of international targets (see Annex A and B of the aforementioned publication for further details).

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), the Environment Agency (EA), Marine Biological Association (MBA) and UK Centre for Ecology & Hydrology (UKCEH). Trends in the extent of invasive non-native species, as presented in Figure 20.1 and 20.2 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, 2018, 2019 and 2020; now comprising of 193 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 2010 to 2019. 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](#)).

Invasion extent of non-native species

The extent to which the non-native species in this indicator are considered invasive is divided into the following 4 categories:

Definition: Not present in territory; **Interpretation:** Absent; **Extent:** 0.

Definition: Present in territory and either not established or with established populations that have not spread more than 10km from their source; **Interpretation:** Not or scarcely established; **Extent:** 1.

Definition: 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; **Interpretation:** Established but still generally absent or at most occasional; **Extent:** 2.

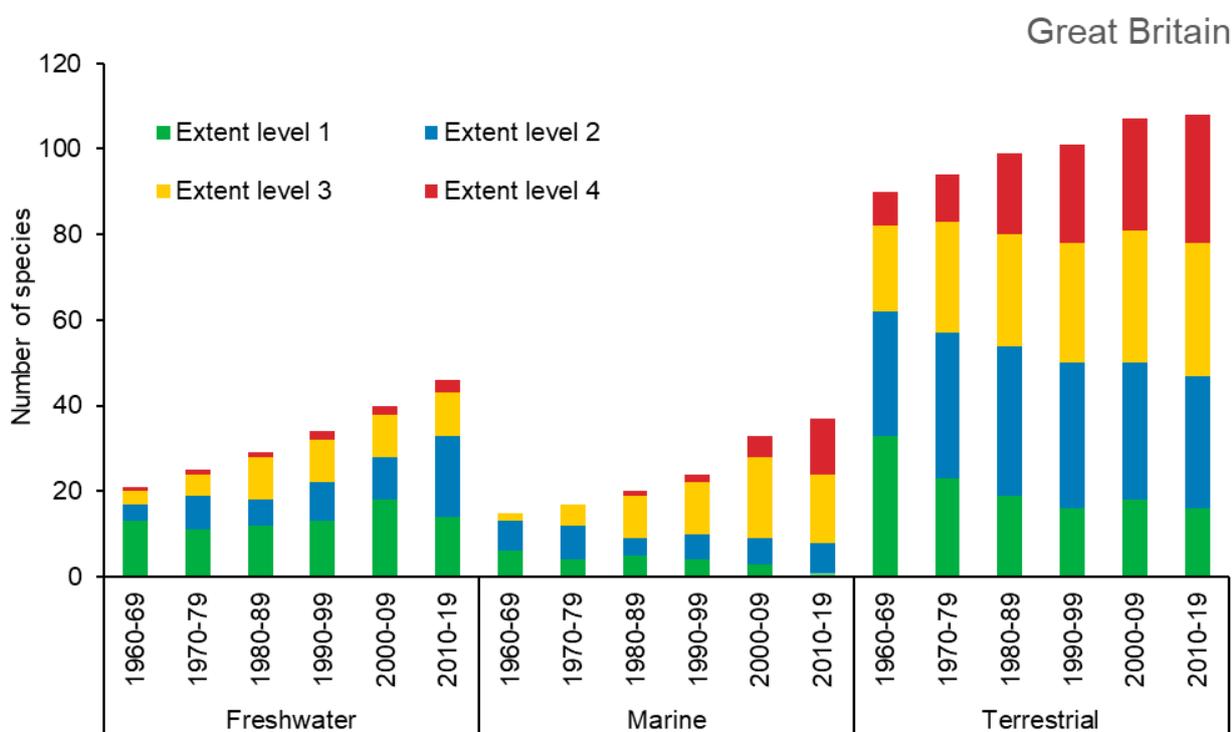
Definition: Established populations present in 10% to 50% of the territory; **Interpretation:** Established and frequent in part of the territory; **Extent:** 3.

Definition: Established in more than 50% of the territory; **Interpretation:** Widespread; **Extent:** 4.

Figure 20.2 shows the number of species in each decade in each extent category listed above. The indicator 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:

- First, 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.
- Second, the extent value is based on relatively broad categories. The extent of some species can increase multi-fold 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.
- Third, 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.

Figure 20.2: Changes in the extent of invasive non-native species in marine (coastal), freshwater and terrestrial environments of Great Britain, 1960 to 2019



Notes:

Extent levels are defined as follows:

1. Extent level 1; Present in territory and either not established or with established populations that have not spread more than 10km from their source.

2. Extent level 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. Extent level 3; Established populations present in 10% to 50% of the territory.
4. Extent level 4; Established in more than 50% of the territory.

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

Web links for further information

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)

EC 6th Framework Programme (Delivering Alien Invasive Species Inventories for Europe (DAISIE)): https://ec.europa.eu/environment/nature/invasivealien/index_en.htm

EU Invasive Alien Species (Regulation): <https://secure.fera.defra.gov.uk/nonnativespecies/index.cfm?sectionid=78>

National Biodiversity Network (NBN) (NBN Atlas): <https://nbnatlas.org/>

UK Centre for Ecology & Hydrology (Technical Background Document): <https://www.gov.uk/government/statistics/england-biodiversity-indicators>

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>

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. and 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. and Pearman, D. (2014). GB Non-native Species Information Portal: documenting the arrival of non-native species in Britain. *Biological Invasions*, **16**(12), 2495–2505.

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Latest data available: 2019