Wyre Estuary Biosecurity Plan (DRAFT)

Wyre Rivers Trust

August 2020

Biosecurity Plan

This plan will outline the invasive non-native species that are already present and those at risk of invading the Wyre estuary as well as proposing steps to take in order to reduce the impact of invasive non-native species in the Wyre Estuary. The aims of the plan are:

- To reduce the risk of introduction and spread of marine INNS and disease to the Wyre Estuary and from the estuary to other areas
- To promote suitable detection, monitoring and rapid response systems for marine INNS
- Develop effective control programmes for existing marine INNS

The plan is for use by all stakeholders in the Wyre estuary and details the current status of the area, potential threats, and suggested measures to improve based on a workshop held with stakeholders in July 2020.

The plan has been created by the Wyre Rivers Trust as part of the RAPID Life Project. This Biosecurity plan aims to compliment the North West Inshore Fisheries and Conservation Authority's "Biosecurity Plan 2014 – 2019 Incorporating Marine Invasive Non-Native Species and Shellfish Disease".

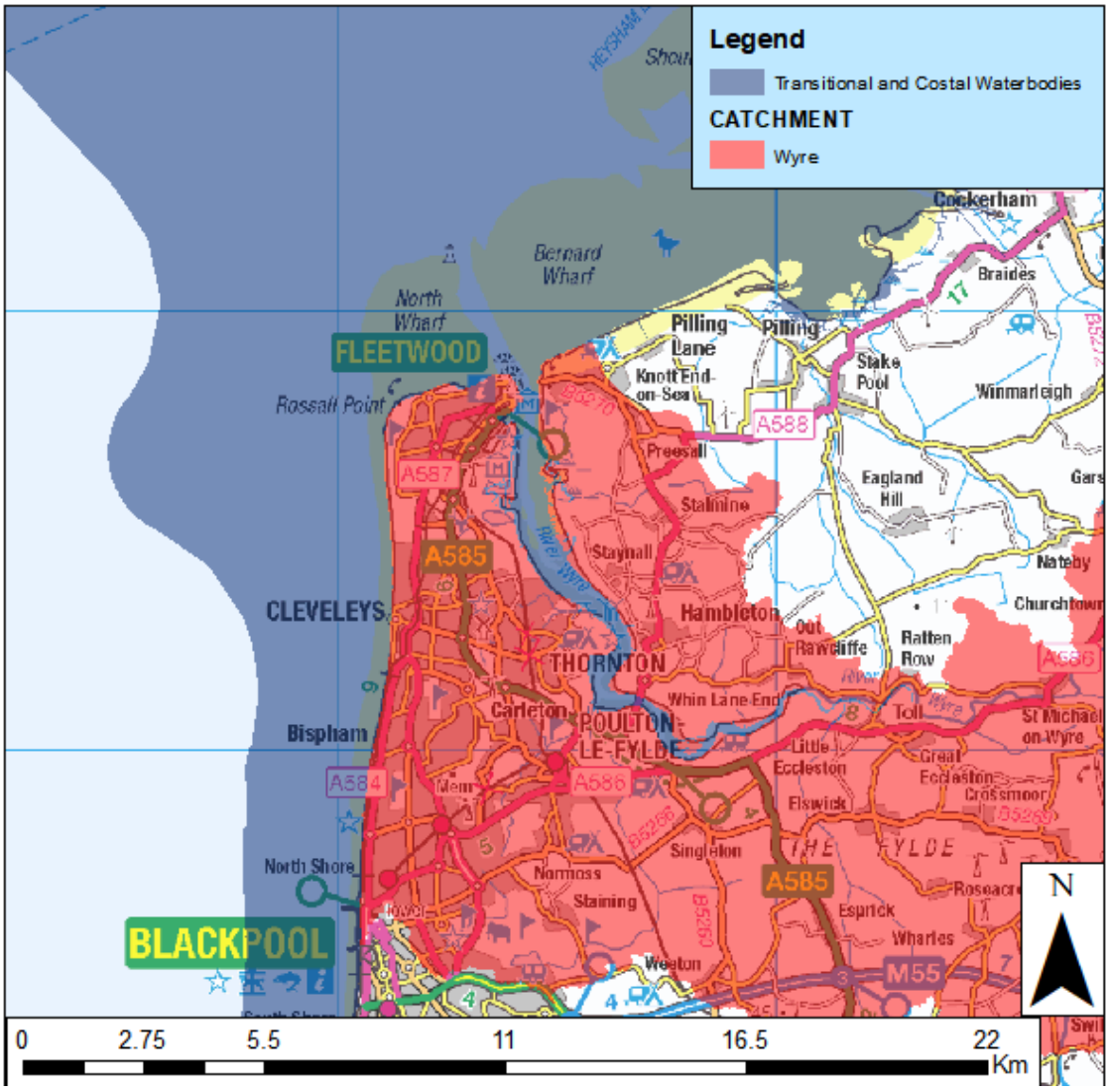

Figure 1 Map of the Wyre Estuary

Introduction

Invasive non-native species (INNS) have been identified as one of the greatest threats to natural ecosystems in the UK, both in terms of their impact on biodiversity and the cost to human activities such as agriculture and fisheries, tourism and development. The Department for Environment, Food & Rural Affairs (Defra) have estimated that they cost the British economy around £1.7 billion per year (Williams *et. al*, 2010). INNS can introduce and spread disease, block sunlight from reaching other plants, out-compete native species for space, food and nutrients and can smother both natural and artificial surfaces. This can have economic impacts in marine and estuarine environments by blocking waterways and fouling equipment and infrastructure.

A study of marine INNS in British ports undertaken by the Marine Biological Association in 2016 highlighted that in general the North West recorded a lower diversity of INNS species than elsewhere along the British coastline. However, on the Wyre Estuary the town of Fleetwood revealed significantly higher number of INNS compared with other North West ports; a total of 11 invasive non-native species were recorded varying in abundance from rare/occasional to abundant/superabundant (Hurst, 2016). Across the world the rate of introduction of new invasive alien species has been growing and shows no signs of slowing (IPBES, 2019). Maritime traffic continues to grow, and the number of invasive species is likely to increase year on year as other species already established in the UK are transported to the Wyre Estuary. Increasing temperatures as a result of climate change may also mean that the estuary becomes more attractive to a wider range of INNS.

This document has been drafted in order to help prevent novel invasive non-native species entering the Wyre and limit the spread of INNS from within the Wyre estuary. It outlines measures which can be taken to reduce the risk of their spread and increase monitoring and reporting of INNS. The document also aims to increase awareness of INNS and their spread within the Wyre estuary.

The Wyre Estuary

The Wyre Estuary extends 18.3km from its mouth between the towns of Fleetwood and Knott-End-on-Sea to its' normal tidal limit at the village of St. Michael's on Wyre. The freshwater input to the Wyre is small (a peak flow 170 m3/s at St. Michael's on Wyre since 1962) compared to the volume of seawater exchanged on each tide, although the freshwater inputs are much greater during winter, this may mean that the management of freshwater and marine INNS may be subject to seasonal requirements, further information is needed to confirm this. The estuary has a relatively large tidal range, with a mean spring tide of 8.2m and mean neap tide of 4.2m. The location of the mouth of the Wyre within Morecambe Bay means that coastal processes in the estuary and Bay are strongly linked. Wave energy may have some ability to transport INNS at the mouth of the estuary, however due to the orientation and narrowness of the estuary mouth, sediment transport from marine sources is largely dominated by tidal currents rather than wave energy.

Regular dredging took place along the lower reaches of the estuary to maintain access to the port, but this ceased following closure of the Stena Ferry service in December 2010.

The Wyre has estuary has a number of marine designations; in 2019 it was designated a Marine Conservation Zone together with the Lune estuary as it provides critical habitat for smelt to complete their life cycle. As a result of the huge numbers of migratory birds which gather within it, the estuarine section of the River Wyre catchment is also designated as a Special Area of Conservation (SAC) and Specially Protected Area (SPA). The mouth of the Wyre also sits at the southern boundary of the Morecambe Bay RAMSAR site, which is the second largest area of intertidal estuarine flats in Britain.

The estuary also has a number of land-based designations; the whole of the estuary is designated as a Site of Special Scientific Interest and supports the largest area of ungrazed saltmarsh in North West England.

The estuary of the River Wyre is a critical pathway for a number of important species of migratory fish and also forms a key spawning ground and home to a wide variety of marine fish species including commercially important species such as cod, plaice, sole and bass. Larger marine mammals such as the harbour porpoise and grey seal also make use of the estuary. Off the coast of the Wyre the honeycomb worm creates reefs for a wide variety of other invertebrates, whilst on the shores of the estuary the saltmarshes are home nationally scarce plants such as rock sea lavender and sea wormwood.

Use of the Wyre Estuary

Fleetwood was once the biggest fishing port on the west coast of England, however much of the major commercial fishing from Fleetwood declined following the cod wars. A number of inshore vessels now use the port facilities at Fleetwood landing a mixture of fish, shellfish and crustaceans and the fish market handles around 5,000 tonnes of fish every year. Regular shore and boat angling also takes place along the coast from Harrowside to Fleetwood, with matches attracting entrants from all over the country.

The Port of Fleetwood has 12.5ha of hard standing and a Ro-Ro berth with 180 tonnes of loading capacity meaning it is well established as one of the UK's major ports for ro-ro traffic to and from Northern Ireland. The Wyre dock which sits at mouth of the river has been developed into a marina with 266 berths for yachts and other pleasure craft. The fish dock has berths for a range of pleasure craft, fishing and survey vessels. Further boat launching facilities are provided in the form of a free public slipway at both Wyre Estuary Country Park and Knott End into the Wyre Estuary. Private facilities are also available through boating clubs at Skippool and Wardleys Creek.

There are various other recreational uses of the Wyre estuary including scuba-diving, canoeing, kite surfing and jet-skiing. The Wyre estuary ferry makes regular trips to transport passengers on the 10 minute journey between Fleetwood and Knot End at the mouth of the estuary. A network of paths provide walking, cycling and horse riding routes, particularly at Wyre Estuary Country Park which is situated on the banks of the Wyre at Stannah. The estuary also provides numerous opportunities for wildlife and bird watching.

There are designated bathing waters for swimmers along stretches of the Fylde coast at Fleetwood, Cleveleys, Bispham and Blackpool North. Outside of the Wyre catchment there are also bathing waters at Blackpool Central, South, St Annes North and St Annes beaches.

INNS Pathways

The main pathways for INNS to enter the Wyre catchment include:

- Hull fouling
- Fouling of fishing equipment
- Fouling of other recreational equipment e.g. wetsuits/ scuba diving equipment
- Relocation of structures or equipment
- Natural dispersal
- Release from aquariums and gardens
- Marine litter
- Ballast water

Biosecurity Actions

A number of measures can be undertaken in order to prevent the spread of invasive non-native species through these pathways**.** Any site may have invasive non-native species and diseases that can be spread by contaminated clothes and equipment, so good biosecurity is always important.

Recreational beach angling, bathing and scuba diving

- All external clothing (waders, boots, swimming costumes, wetsuits) and equipment should be **checked** for any signs of sediment or organisms
- Equipment should be checked before leaving the site so that invasive species aren't accidentally transported. Any organisms that are found later should be thoroughly dried out and put in a bin rather than being washed down drains where they could contaminate another watercourse.
- All equipment and clothing should be thoroughly **cleaned** before being used elsewhere.
- All vessels, clothing and equipment should be **dried** for as long as possible, as some invasive plants and animals can survive for up to two weeks in damp conditions. It is thought to be beneficial to dry vessels, clothes and equipment in sunshine where possible
- More information for anglers can be found in the following video: http://www.nonnativespecies.org/checkcleandry/ccdVideos.cfm?video=8

Boats - commercial and recreational boat fishing, sailing, canoes and paddleboards

- Boats should be power-washed with fresh water before being transported and used in a different body of water to prevent introduction of new INNS or disease. All sediment, plant and animal material should be removed (both from the vessel and from any gear used) and left at the site or placed in the bin. The boats hull, bilge area, deck and fixed equipment such as anchors and winches should be cleaned with freshwater and any water that collects in bilges or inside canoes and kayaks should be emptied. Particular attention should be paid to ropes, trailers, and areas that are damp and hard to access. Hot water should be used where possible.
- If a vehicle enters the intertidal area to launch a boat it should also be cleaned afterwards to remove all sediment and organic matter, especially around tyres and wheel arches.
- All external clothing (boots, waterproofs, waders) and equipment should also be checked, cleaned and thoroughly dried before being used again. All vessels and equipment should be dried for as long as possible before being used elsewhere.
- Where possible boats and equipment should be dried in sunlight.
- Anti-fouling should be re-applied annually, especially for boats which have not been moved for long periods of time.
- It's even more important to Check Clean Dry if kit is used abroad to ensure invasive plants and animals are not brought back.

Further information for boat users can be found at:
http://www.nonnativespecies.org/checkcleandry/ccdVideos.cfm?vid

Port authorities, harbour masters and boat owners

- Follow good practice advice on ballast water and do not discharge non sterilised ballast water whilst in a port, harbour or other enclosed area.
- Where practical, remove man-made structures such as moorings, fenders and vessels from the water when they are not in use. INNS often prefer artificial structures, therefore removing what you can is an easy basic biosecurity measure.

- Air dry equipment and infrastructure when possible, as often as possible - most aquatic INNS are killed by dehydration. Designating an area or room for drying kit could help to promote the importance of drying and reduce the risk of spreading INNS.
- Try to identify vessels which are used less frequently, such as barges or dredgers, which can be hauled out and dry stored, even if only for temporary periods of time.
- Expose equipment and vessels to fresh water. Most marine INNS need some degree of salinity to sustain their life cycle, so immersion or washdown in freshwater can reduce the risk posed by INNS. Make the most of any natural flows of freshwater into your site.
- Train staff to be aware of INNS and their impact so that they are alert to unusual organisms.
- Place posters and guides in mess rooms and offices to aid familiarity.
- Encourage an open culture of reporting unusual sightings and looking out for INNS when undertaking routine visual inspections of infrastructure and vessels. Photograph and record extent as well as latitude and longitude.
- Encourage the use of iRecord for reporting invasive species. https://irecord.org.uk/app/
- Haul out work boats at least annually to ensure they are effectively and appropriately treated with antifoul.
- Ensure vessels arrive and leave harbours with a clean hull
- Upgrade wash down facilities to ensure capture and/or treatment of run off.
- Make sure contractors follow the measures outlined here by asking for a biosecurity risk assessment for approval 6 weeks prior to commencement of works. Contractors should ensure that all equipment, materials, machinery and PPE used are in a clean condition prior to their arrival on site.

Local authorities and the general public

- There are growing concerns about the role of marine litter in the spread of marine INNS. Plastics can act as a raft on which potential invasive species can attach, which may expand a species' ability to colonise new regions. Preventing marine litter as a pathway for INNS can be supported through continued beach clean events and awareness raising activities.

Monitoring and Engagement

As part of this project several promotional signs have been put up around the Wyre catchment to promote and educate estuary users about biosecurity. Council slipways are to be used as key points for engagement. Where possible partner organisations should promote knowledge of biosecurity through media on websites, in their buildings and on their land, as well as through social media. Events to train staff to identify and report invasive species should also be promoted.

Supported by its partners, the Wyre Rivers Trust will be holding the third Wyre Estuary Bioblitz in 2021 which will have a strong focus on recording and engaging with members of the public on INNS.

Wyre Council will also be providing volunteer training events to help with identification of INNS species. Events to be run in association with Blackpool and the Fylde college to promote monitoring and reporting of INNS.

The North West Coastal Forum is hoping to set up a regional INNS network that will aim to connect partner organisations in supporting monitoring and rapid response systems for INNS within the Wyre estuary.

Table 1 - Invasive species which are present within the North West and in the Wyre Estuary

Species	Present in North West?	Present in Wyre Estuary?	Description	Threat
Ascidians				
Leathery sea squirt (*Styela clava*)	Yes	Yes	A leathery, brown sea squirt attached by a small flat holdfast at the base of a narrow stalk with two siphons close together at the free end. Adults are not known to have any predators in the Atlantic.	They can be a fouling pest on ship hulls and infrastructure. They may have a negative effect on the abundance and habitat occupancy of other native sessile invertebrates due to their large size and rapid growth, but it is not known if they can cause local extinctions. Their holdfast takes up little space, and the tunic covering is often covered by other sessile species, therefore the sea-squirt could actually enhance biodiversity per unit area of substrate.
Orange tipped sea-squirt (*Corella eumyota*)	Yes	Yes	This is a solitary sea squirt, 2-4 cm long, with a curved or U-shaped gut.	It may threaten oyster and mussel farms through fouled gear and by smothering and outcompeting cultures.
Chain tunicate (*Botrylloides violaceus*)	Yes	Yes	A colonial sea squirt which forms irregular, flat sheets. Large colonies can reach 30 cm in diameter and can be up to 3mm thick.	Grows on a variety of surfaces, including docks, boat hulls, buoys, ropes, pilings, the undersides of rocks, and seaweeds. It has also been found to overgrow mussels, barnacles, encrusting bryozoans and other species of sea squirts.
San Diego sea squirt *(Botrylloides diegensis)*	Yes	Yes	This colonial sea squirt from the west coast of North America was first recorded in the UK in 2004 on the S English coast, where it is now very common in marinas.	Spreading in England, provides a potential threat to aquaculture through smothering.
Aplidium cf. glabrum	Yes	Yes	Consists of groups of very flat-topped lobes closely pressed together, with sand coated sides. Widespread in the UK.	It is a potential threat to biodiversity and aquaculture through smothering and colonies can block inlet pipes.
Carpet sea squirt (*Didemnum vexillum*)	No	No	A colonial sea squirt that can form large, leathery patches in shallow water marinas and harbours.	Identified by North West Inshore Fisheries and conservation Authority (NWIFCA) as being a potential threat to North West waters as present in surrounding waters. It can potentially smother underwater structures and native plants or animals. Based on current predictions, this species could cost mussel farming between £1.3 and £6.8 million over the next ten years.
Bryozoans				
Tricellaria inopinata	Yes	Yes	*Tricellaria inopinata* forms erect, bushy, and	This species is a fouling pest and can cause habitat alteration, modification of natural

			branched colonies which are cream-to-buff in colour.	benthic communities and reduced native biodiversity through competition.
Bugulina simplex	Yes	Yes	Erect straw-coloured bryozoan that forms funnel-shaped colonies. Thought to be native to east coast of North America or the Mediterranean.	Impact is unknown
Bugulina stolonifera	Yes	Yes	Greyish-buff erect bryozoan which forms short compact tufts. Native to the Atlantic and Mediterranean.	Impact is unknown
Arthropods				
Acorn barnacle (*Austrominius modestus*)	Yes	Yes	A fast growing barnacle which tolerates a wider range of salinity, temperatures and turbidity than most native species.	Can dominate hard surfaces and displace native species; it has largely displaced native barnacles in estuaries in south west England. It can also foul boats and other artificial structures.
Asian Shore Crab (*Hemigrapsus sanguineus*)	No	No	A small crab with banding on its walking legs and three distinct 'teeth' on each side of the square carapace which grows up to 4.5 cm across.	Identified by NWIFCA as a potential threat to fisheries in the North West. It is an omnivore that may affect native crab, fish and shellfish populations by disrupting the food-web. When established it also competes with native shore crabs for food and space, and may prey on commercially important species such as small bivalves, therefore potentially damaging shellfish production/ fisheries.
Amphibalanus improvisus (bay barnacle)	Yes	No	Barnacle with tolerance to a wide range of environmental conditions and high reproductive capacity.	The species damages man-made constructions and ships, causing substantial economic expense, and threatens biological diversity, competing with local species for food as well as space.
Japanese skeleton shrimp *(Caprella mutica)*	Yes	No	An aggressive skeleton shrimp originally from North East Asia.	It can clog equipment and nets and outcompete native species. It is found in harbours and marinas amongst fouling growth on boat hulls, ropes and nets.
Killer shrimp (*Dikerogammarus vilosus)*	Yes	Yes	A highly invasive freshwater shrimp species.	Identified by NWIFCA as a potential threat to fisheries in the North West. A voracious predator, killing invertebrates and small fish. It is able to quickly dominate the habitats it invades and can significantly alter their ecology.

Chinese mitten crab (*Eriocheir sinensis*)	Yes	No	The Chinese mitten crab is a large crab with a distinguishing dense mat of hair on its claws, originally from South East Asia.	Predates a range of invertebrate species and fish eggs and competes with both freshwater and marine native species. They can also carry disease. Adults usually burrow and live in river banks, increasing erosion and river turbidity, causing banks to collapse and the siltation of gravel beds, causing damage and loss of spawning grounds for salmonids which are key species in the Wyre.
Polychaetes				
Ficopomatus enigmaticus (tubeworm)	Yes	No	A tube worm of unknown origin. The North West was assumed to be outside its thermal range for successful reproduction but hot summers and mild winters are presumed to have allowed its spread.	Causes ecological damage by outcompeting native species. In some locations, economic impacts occur due to the prolific growth that can cause blocking of thermal effluents and fouling of aquaculture ponds and leisure crafts.
Molluscs				
Pacific oyster (*Crassostrea gigas*)	Yes	Present at Blackpool and Cockerham	Originally from Asia but now farmed throughout the UK. Escapees have settled into several populations.	They compete with blue mussels and smother other local species, as expanding into other habitats on lower shore coastal hard substrates.
Slipper Limpet (*Crepidula fornicate*)	Yes	No	Outcompetes other filter feeding species and is found mainly associated with pebbly shores or attached to structures such as piers. It can be associated with aquaculture operations and is a pest on oyster and mussel beds.	Identified by NWIFCA as being a potential threat to North West waters as it is already present in surrounding waters. It outcompetes local filter feeding species.
Zebra mussel (*Dreissena polymorpha*)	Yes	Yes	A freshwater mussel species with a distinctive striped colouration and shape that grows in stacks. They are found commonly across England.	Identified by NWIFCA as a potential threat to fisheries in the North West. It attaches to anything solid underwater such as masonry, stones, wooden posts, tree roots or shells using sticky threads. This attachment can block pipework and affect lock gates and other infrastructure in the water. They can also significantly alter ecosystems by smothering native species and rapidly filter out nutrients from the water.
Algae				
Green sea fingers (*Codium fragile)*	Yes	No	Spongy green seaweed with numerous Y-shaped, branching, cylindrical fronds with a felt-like texture. It usually	It has the potential to compete with native species for space, forming dense clumps and potentially altering community structure. It fouls nets and may attach to, uplift and move commercially produced shellfish and seaweed.

			grows to around 25 cm in Britain.	It is well established so prevention of further dispersal is unlikely.
Wakame (*Undaria pinnatifida)*	Yes	Yes	A large brown seaweed of from Japan, with wavy corrugated edges at the base. Individuals can reach an overall length of 1-3m.	It may compete for space with native species that live attached to hard surfaces, including native kelp species, due to its ability to grow quickly and colonise newly cleared areas. It may be a nuisance where it forms rafts and reaches high levels of abundance, fouling jetties, vessels, mooring and buoys.
Wireweed (*Sargassum muticum*)	Yes	No	Large brown alga native to Japan and the North West pacific. Grows on hard substrates in water depths of up to 5 m.	Wireweed competes with native seaweeds and seagrasses through rapid growth, shading and abrasion. It can dominate rockpools, altering the habitat by reducing the light and changing the temperature. Large populations can tangle in boat propellers and cause a nuisance in other recreational activities such as swimming and diving.
Terrestrial Plants				
Common cord grass (*Spartina anglica*)	Yes	Yes	A hybrid of a North American and a British native species which is well established across the UK.	Dominates lower areas of estuarine salt marshes and intertidal mudflats, excluding native flora and fauna which could seriously affect populations of migratory wildfowl and waders which the Wyre Estuary is known for.
Japanese Rose (*Rosa rugosa*)	Yes	Yes	Commonly planted in gardens and parks, it has spread to the wild through garden waste. It has white to pink flowers followed by large, orange or red hips that are attractive to birds.	It spreads quickly to form large, dense thickets that can out-compete native species. Its distribution in the wild is on the increase, and it's especially frequent in coastal sites such as the dunes and salt marsh found in the Wyre Estuary where a number of rare plants may be at risk.
Giant hogweed (*Heracleum mantegazzianum*)	Yes	Yes	Grows up to 6 m high. Each plant produces tens of thousands of seeds which can remain viable for many years.	Forms large dense stands which crowd out native plants. Sap from the plant can burn skin in the presence of sunlight.
Japanese knotweed (*Fallopia japonica*)	Yes	Yes	Can colonise most habitats, including riverbanks and coastal habitats.	Can grow through concrete and tarmac with roots that can grow 3 m deep. Removal is challenging due to it's ability to grow from tiny fragments of plant. In 2003, the Government estimated that it would cost £1.56 billion to control this plant across the country.
Himalayan balsam (*Impatiens glandulifera*)	Yes	Yes	Grows up to 2.5m high from seed in a single season making it Britains tallest annual. It has pretty pink flowers and reddish stems.	It spreads quickly and forms dense thickets, taking over large swathes of wetland habitats. Seeds can be projected up to four meters away which means it quickly contaminates areas both upstream and downstream. It is attractive to pollinators and therefore may result in decreased pollination for other native plants.

Sources:
https://www.cabi.org/
https://www.nw-ifca.gov.uk/app/uploads/NWIFCA-Biosecurity-Plan.pdf
https://www.livingseasnw.org.uk/sites/default/files/2018-04/NW%20INNS%20report%20HH%202016%20FINAL.pdf
https://www.conservationjobs.co.uk/articles/b-for-botrylloides-violaceus-an-a-z-of-invasive-marine-species/
https://www.plantlife.org.uk/uk/discover-wild-plants-nature

Identification and recording

The following provide easy to use identification guides:
http://www.nonnativespecies.org/index.cfm?sectionid=47

https://www.solwayfirthpartnership.co.uk/wp-content/uploads/2020/06/INNS-in-the-Solway.pdf

http://www.eastern-ifca.gov.uk/wp-content/uploads/2018/01/MSFD_UK_priority_species_ID_guides.pdf

Species can be recorded using the iRecord App- https://irecord.org.uk/app/.

References

Hurst, 2018 Monitoring invasive non-native species in marinas of North West England Report to Natural England

Halcrow Group Ltd, 2013 North West Estuaries Processes Reports Wyre Estuary. Prepared for Sefton Council

IPBES (2019): Summary for policymakers of the global assessment report on biodiversity and ecosystem services of the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services. IPBES secretariat, Bonn, Germany. 56 pages.

Williams et al, 2010 The Economic Cost of Invasive Non-Native Species on Great Britain. CABI