Cornwall IFCA
Inshore Fisheries and Conservation Authority

Biosecurity Plan 2019

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Glossary of abbreviations

IFCA – Inshore Fisheries and Conservation Authority

INNS – Invasive Non-Native Species

MCZ – Marine Conservation Zone

SAC – Special Area of Conservation

SPA – Special Protection Area

Invasive Non-Native Species

Non-native species are those which have become established outside of their natural range, through either direct or indirect human action. In 2015 it was estimated that there were about 2,000 non-native species established in the UK, with approximately 80 of these in the marine environment (Defra, 2015). The south and south-west coasts of the UK are considered to have far more non-native species than other areas of the UK coast (Marine Strategy – Part One).

Non-native species become invasive when they are having a significant negative impact in their new environment. Of the 2,000 non-native species identified in 2015 approximately 10-15% were considered to be invasive non-native species (INNS) (Defra, 2015). Negative impact of invasive species can vary widely, from ecological impacts on native species to financial impacts. Impacts in the marine environment can include altering habitats, competing with or predating on native/commercially important species and fouling vessels, fishing gear and marinas. In 2010, a large scale review estimated that INNS were costing the GB shipping industry £32.75 million annually, mainly through the costs of ballast water treatment (Williams *et al*., 2010). The cost to aquaculture was estimated at £7.15 million (Williams *et al*., 2010).

Pathways of introduction

Common pathways of introduction in the marine environment include commercial shipping, the transport of organisms for aquaculture and recreational boating. Commercial shipping is one of the most widely recognised pathways for the transport of non-native species and at any one time it is estimated that 3,000 - 7,000 species are in transit in ballast water globally (Gollasch *et al*., 2015). The International Convention for the Control and Management of Ships' Ballast Water and Sediments (BWM Convention) came into force in 2017 and sets standards for the management and control of ships ballast water. More detail about introduction pathways is given in Table 1. As our climate changes conditions in Cornish waters may become more favourable for new species to increase their northerly limits and establish in Cornwall.

Table 1: Common pathways of introduction for non-native species in the marine environment.

Sector	Pathways of Introduction
Commercial shipping	Transport of organisms in ballast water Attachment to vessel hulls
Aquaculture	Live introduction of invasive organisms for the food market e.g. Pacific oysters Introduction of additional species accidentally e.g. invasive seaweeds used as packaging, juvenile crabs in transported mussel seed Escape of aquaculture species Deliberate release of aquaculture species
Recreational boating and water use	Attachment on vessel hulls Attachment to kayaks, paddleboards and other watercraft Attachment to buoys, moorings, anchor chains
Fishing	Attachment on vessel hulls Fouling on fishing gear (pots, ropes, chains, anchors) Discard of bycatch in different area

Biosecurity

Biosecurity can be defined as measures taken to prevent (or reduce the risk of) non-native species from being transported to and establishing in new areas.

Numerous pieces of legislation; worldwide, European and national, set out the UK's obligations regarding the management of INNS. The most relevant pieces of legislation for the marine environment are noted below in Table 2. A comprehensive list, from which the information below was summarised, can be viewed on the GB Non-Native Species Secretariat (GB NNSS) website[1]:

Table 2: The relevant worldwide, European and National legislation regarding the management of INNS.

Legislation	Description
Worldwide	
Convention on Biological Diversity	Under this convention member states should 'as far as possible and as appropriate, prevent the introduction of, control or eradicate those alien species which threaten ecosystems, habitats or species'.
United Nations Convention on Law of the Sea	Member states should take all necessary measures to 'prevent, reduce and control the intentional or accidental introduction of species, alien or new, to a particular part of the marine environment, which may cause significant and harmful changes thereto'.
European Legislation	
European Union Invasive Alien Species Regulation	Establishes a list of species of Europe wide concern for member states to act upon and calls for the surveillance and management of invasive species.
Bonn Convention	Calls for action where non-native species are affecting the conservation of migratory species.
Habitats Directive	Calls for regulation of any deliberate introductions, so as not to negatively impact native habitats, fauna and flora.
Water Framework Directive	Obliges member states to set measures for their inland, transitional and coastal waters to achieve 'good ecological status', initially by 2015.
Marine Strategy Framework Directive (MSFD)	Obliges member states to set measures for their marine waters to achieve 'good environmental status' by 2021, which requires management of INNS. The MSFD also established a list of priority invasive species for monitoring and priority invasive species for surveillance.
Aquaculture Regulation	Sets up a framework to look at and minimise the possible impacts of non-native species used in aquaculture on their environment.
UK Legislation	
Wildlife and Countryside Act (WCA) 1981	This is the main piece of national legislation regarding non-native species. Under section 14(1) it is illegal to release or allow to escape into the wild any animal 'which is not ordinarily resident in and is not a regular visitor to Great Britain in a wild state; or is included in Part 1 of Schedule 9'. Section 14ZA makes it an offence to sell, offer or expose for sale, or possess or transport for the purposes of sale, certain non-native species which are listed in Schedule 9 of the WCA.
Live Fish Import Act	This act allows the import, keeping or release of non-native fish, or their eggs, to be prohibited or licensed by the relevant minister. The act relates to species which could negatively impact freshwater fish, shellfish or salmon.

[1] Available from: http://www.nonnativespecies.org/index.cfm?sectionid=23 [Accessed: October 2018]

The Great Britain Invasive Non-Native Species strategy of 2008 was updated in 2015 and sets out a framework for co-ordinated action on non-native species across Great Britain (GB). The GB Non-Native Species strategy is published by Defra, the Scottish Government and the Welsh Assembly. The strategy aims to 'minimise the risk posed by and reduce the negative impacts of invasive non-native species (INNS) in GB'. It follows the CBD hierarchical approach stressing prevention, followed by early detection and rapid response and finally long-term management and control' (Defra, 2015).

Cornwall IFCA

Cornwall Inshore Fisheries and Conservation Authority (IFCA) is one of ten IFCA's around England that were created by the Marine and Coastal Access Act 2009 (MACA). The IFCAs were set up to manage the UK's inshore fisheries (out to six nautical miles) sustainably whilst balancing environmental and socio-economic interests.

Cornwall IFCA Biosecurity Plan

Invasive non-native species have the potential to seriously impact on fisheries, through fouling fishing equipment, altering habitats and predating on/competing with native and economically important species. Cornwall IFCA therefore has a responsibility to produce a biosecurity plan for the inshore fishery district. This plan will identify already established invasive species (as well as those to look out for), communicate biosecurity protocols for the district and identify further actions for Cornwall IFCA to take regarding biosecurity.

Cornwall IFCA District

The Cornwall IFCA district extends from Marsland Mouth on the north coast of Cornwall, around to the western end of the Plymouth Breakwater in Plymouth Sound on the south coast (Figure 1). The district includes all the waters out to the six nautical mile limit from 1983 baselines, including all rivers and estuaries up to tidal limits.

The Cornwall IFCA district covers at least 250 miles of coastline, excluding estuaries. The coastline is very diverse, with sea cliffs, coastal dunes, large estuaries, sheltered coves and large sandy beaches. The north coast of Cornwall is more exposed to the Atlantic swell and prevailing winds, whilst the south coast is generally more sheltered with a number of large estuaries.

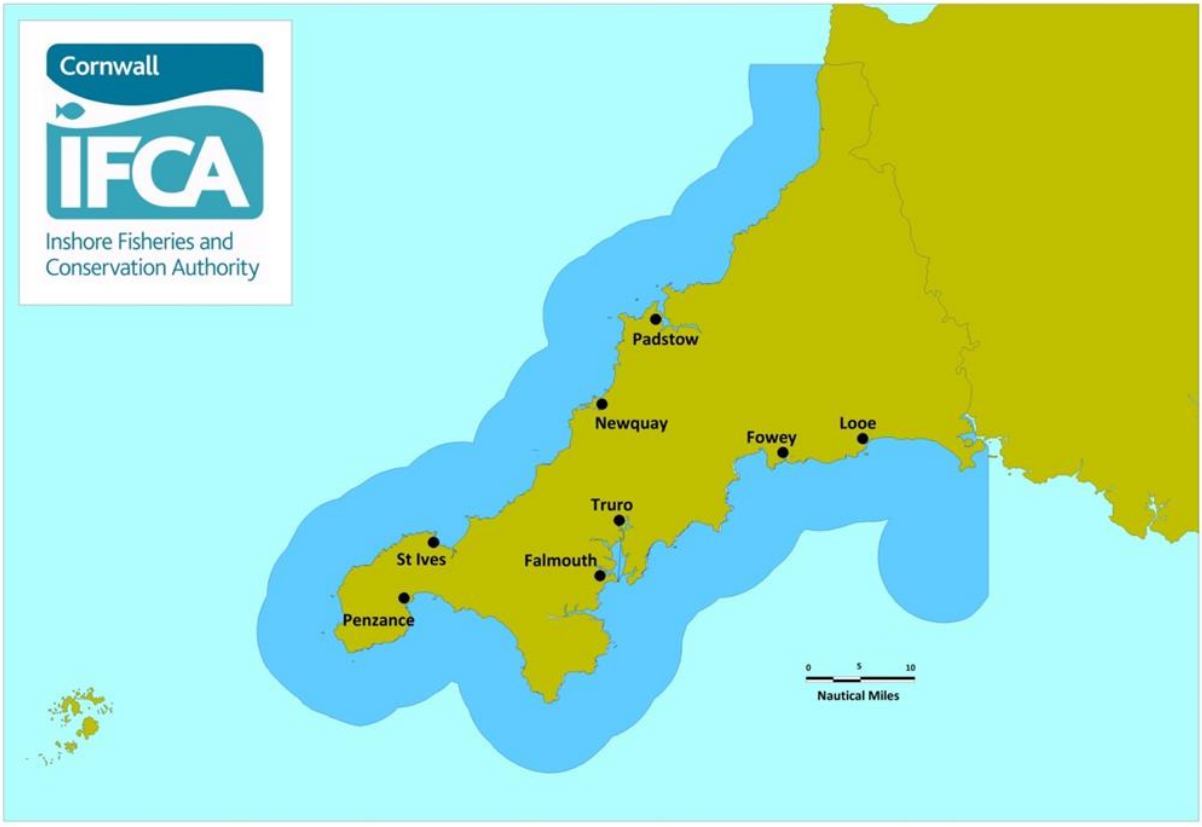

Figure 1: Cornwall IFCA district shown in dark blue

Marine Protected Areas

The Cornwall IFCA district currently includes 12 Marine Conservation Zones (MCZ) (Tranche 1 and 2 sites shown in Figure 1), six Special Areas of Conservation (SAC) (Figure 3) and two Special Protection Areas (SPA) (Figure 4).

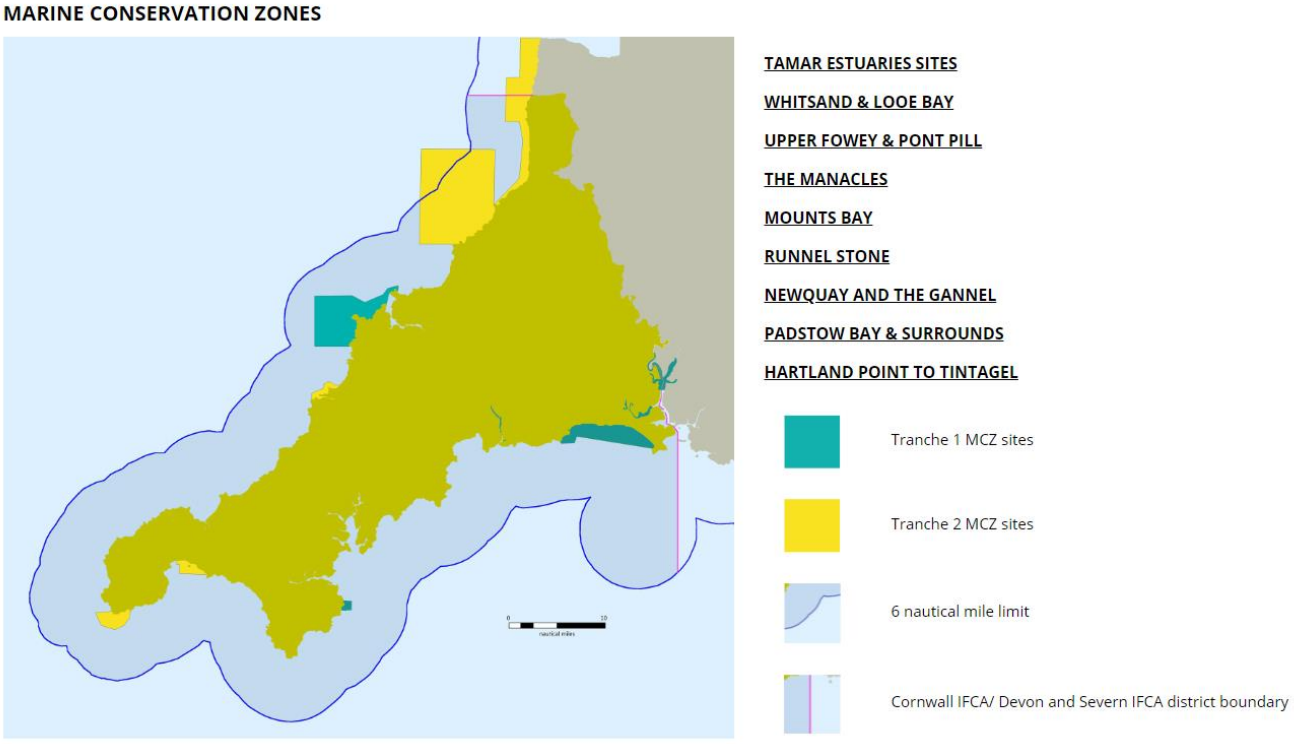

Figure 2: Tranche 1 and 2 Marine Conservation Zones in the Cornwall IFCA District

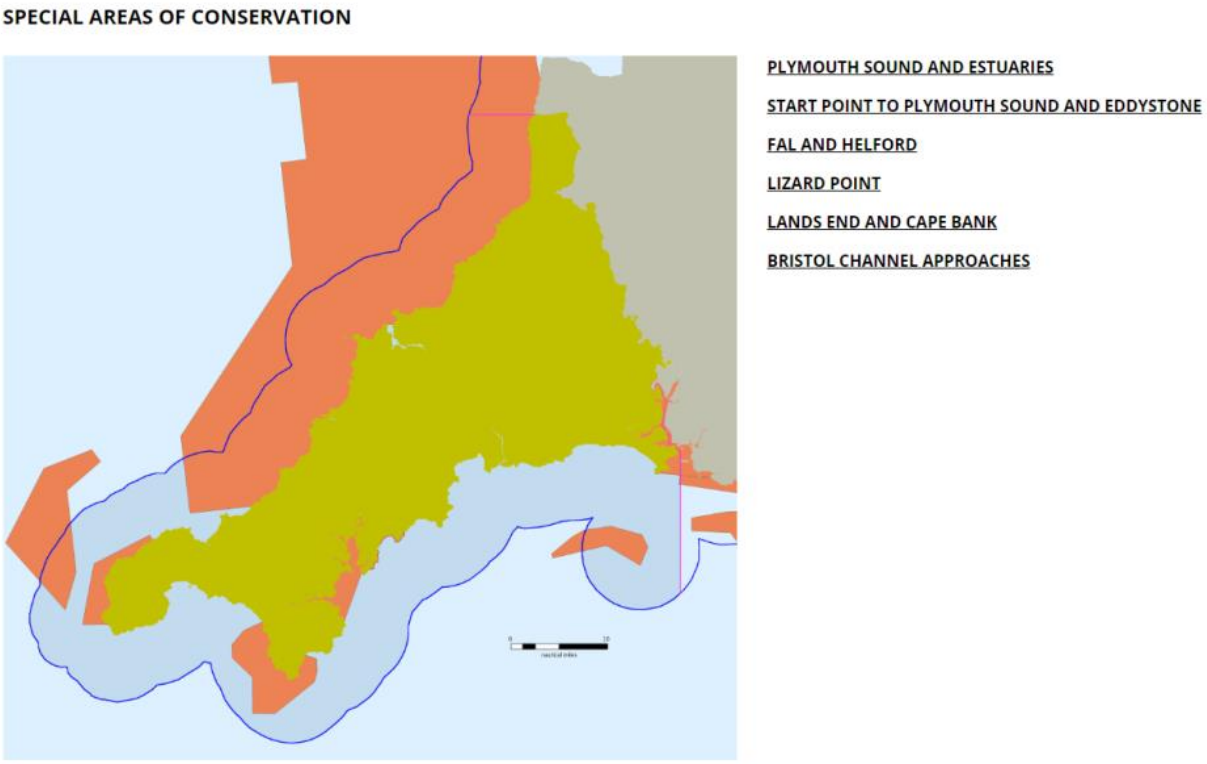

Figure 3: Special Areas of Conservation in the Cornwall IFCA District

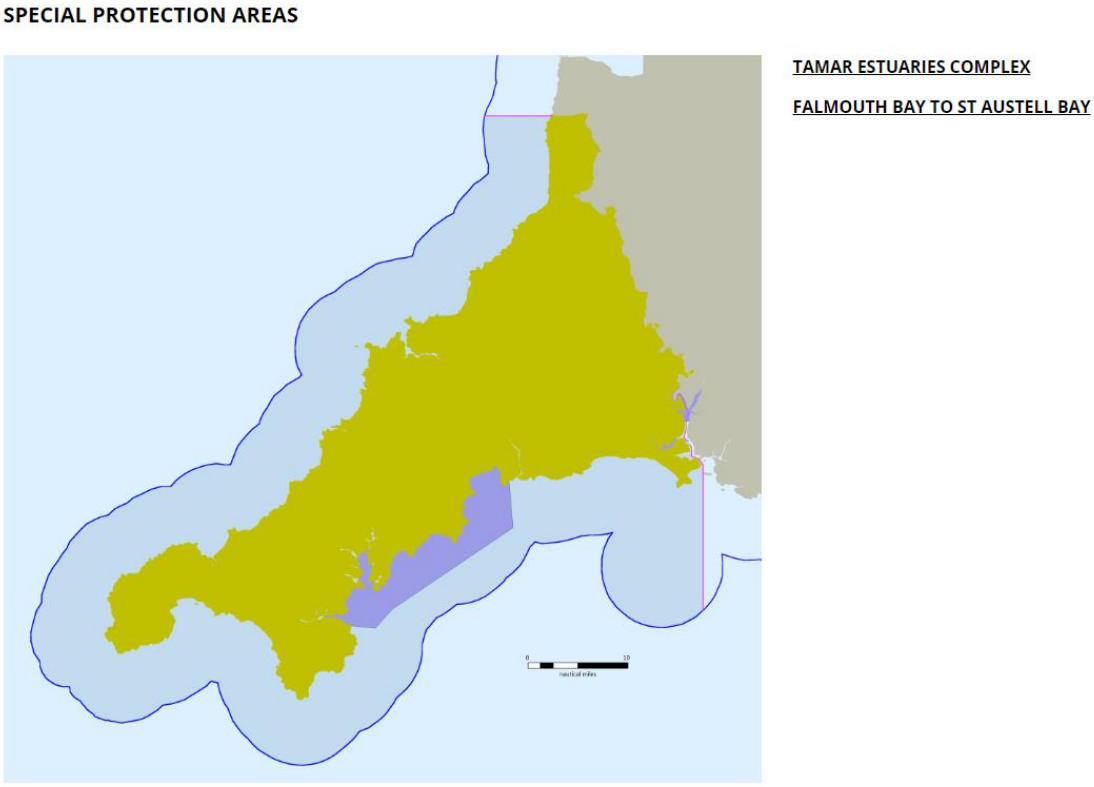

Figure 4: Special Protection Areas in the Cornwall IFCA District

Use of the Marine Resources

The sea around Cornwall is well used both recreationally and commercially. There are large commercial ports at Falmouth, Fowey and Truro. Small harbours and marinas can be found all around the Cornish coast and are well used by both the fishing industry and recreational boaters. Water sports are also very popular, with surfing, kite surfing, kayaking and paddle-boarding popular activities. Sea angling is also very common. All of these recreational activities occur throughout the year, but at a higher frequency in the spring and summer months.

Fishing Activity in Cornwall

Cornwall is a busy fishing district with working ports along both coasts and a range of inshore fisheries. Newlyn on the south coast is the busiest fishing port, with 114 registered fishing vessels (under 10 m) in 2017 (data from the Cornwall IFCA 2017 Port Survey).

Potting and netting for shellish is one of the largest fisheries in the district and requires a permit under the Lobster, Crawfish and Crab Fishing Permit Byelaw 2016. In 2018, 325 boats were registered for shellfish permits to work in the Cornwall IFCA district. Netting and hand-lining are also large fisheries in the Cornwall IFCA district. Netters target a wide variety of fin fish, whilst hand-lining mainly targets pollack, mackerel and bass. Trawling and dredging both occur within the district, with a byelaw limiting scallop dredging to between 7am and 7pm. Under the Closed Areas (European Marine Sites) No 2 Byelaw the use of bottom towed fishing gear is probited in most SACs in the Cornwall IFCA district.

Potting for wrasse in the district is a relatively new fishery which has only emerged over the last few years. The Live Wrasse Fishing (Limited Permit) Byelaw 2018 has introduced permits for this fishery (limited to five), closed areas to fishing and set minimum sizes for each species.

On the south coast the Fal fishery operates as a traditional fishery for native oysters (*Ostrea edulis*), queen scallops and blue mussels (*Mytulis edulis*). The fishery is worked by sail powered boats using hand towed dredges and includes hand gathering of shellfish from the shoreline. The Fal fishery operates from October to March inclusive and is managed by Cornwall IFCA through the Fal Fishery Order 2016.

The Cornwall IFCA Port Survey in 2017 details most of the registered fishing vessels in Cornwall and the means by which they fish. However, this data should be taken as a guide only. Many smaller boats fish using a variety of methods, depending on the season, and are therefore replicated across the table. Boats may also work inside and outside of the 6nm limit, the extent of the Cornwall IFCA district. Only boats under 10 m have been detailed in Table 3, as larger boats are likely to work outside of the district.

Table 3: The number of boats (under 10m) registered to fish by different methods in the 2017 Cornwall IFCA Port survey. Some boats fish using a variety of methods, others work both inside and outside of the district. The data should therefore be taken as a guide only.

Fishing Method	Number of boats (<10 m)
Potters	221
Netters	300
Handliners	320
Trawlers	13
Beam Trawlers	1
Scallopers	8
Anglers	4
Charter Anglers	7
Ring Netters	2
Diving	2

For more information about fishing in the Cornwall IFCA district and relevant byelaws visit: www.cornwall-ifca.gov.uk/

Aquaculture Facilities

There are a range of aquaculture facilities for shellfish in the district, primarily for native mussels (*Mytilus edulis*) and non-natïve Pacific oysters (*Magallana gigas*). Pacific oyster farms in the district are all situated in estuarine sites and are located on both the north and south coast. Currently, there are no aquaculture facilities for fin fish.

Invasive Non-Native Species

Overview

The Marine Biological Association (MBA) identification guide for selected marine non-native species[2] identifies 36 seaweeds and animals which may be found in ports and marinas, on boat hulls, on fishing gear or aquaculture equipment and on natural shores. The following 30 species (Table 4 and Table 5) have been recorded in Cornwall (NBN Gateway, 2018) or close to the border of the Cornwall IFCA district in the Tamar Estuary (marked with an *) (Wood *et al*., 2017).

Seaweeds

Table 4: Non-native seaweed species recorded in the Cornwall IFCA district or in the bordering Tamar Estuary

Common name	Latin name
Harpoon weed	*Aspargopsis armata*
Hook weed	*Bonnemaisonia hamifera*
Pom-pom weed	*Caulacanthus* sp.
Golden membrane weed	*Chrysymenia wrightii*
Green sea fingers	*Codium fragile fragile*

[2] Available from: www.mba.ac.uk/sites/default/files/downloads/ID%20NNS%20English.pdf [Accessed: October 2018]

Oyster thief	*Colpomenia peregrina*
Siphoned Japan weed	*Dasysiphonia japonica*
Devil's tongue weed	*Grateloupia turuturu*
Wireweed	*Sargassum muticum*
Wakame	*Undaria pinnatifida*

Animals

Table 5: Non-native animal species recorded in the Cornwall IFCA district or in the bordering Tamar Estuary

Common name	Latin name
*Striped barnacle	*Amphibalanus Amphitrite*
Compass sea squirt	*Asterocarpa humilius*
Darwin's barnacle	*Austrominius modestus*
*San Diego sea squirt	*Botrylloides diegensis*
Orange cloaked sea squirt	*Botrylloides violaceus*
Ruby bryozoan	*Bugula neritina*
Japanese skeleton shrimp	*Caprella mutica*
Orange-tipped sea squirt	*Corella eumyota*
Slipper limpet	*Crepidula fornicata*
Orange-striped anemone	*Diadumene lineata*
*Carpet sea squirt	*Didemnum vexillum*
*Trumpet tube worm	*Ficopomatus enigmaticus*
American lobster	*Homarus americanus*
Pacific oyster	*Magallana gigas*
Creeping sea squirt	*Perophora japonica*
*Orange ripple bryozoan	*Schizoporella japonica*
Leathery sea squirt	*Styela clava*
Tufty-buff bryozoan	*Tricellaria inopinata*
*American oyster drill	*Urosalpinx cinrea* – last record in the Tamar in 1998
Red-ripple bryozoan	*Watersipora subatra*

It is important to note that records do not necessarily indicate that a species is established, and some species once recorded may not necessarily still be present.

Cornwall IFCA District

Of the invasive non-native species already established in the Cornwall IFCA district the following are potentially the highest risk for fisheries. A number of these species are identified in the Marine Strategy Framework Directive (MSFD) as UK Priority invasive species for monitoring. All species information is from the GB NNSS species pages unless referenced otherwise.

Pacific oyster[3]

Scientific name: (*Magallana gigas)*
MSFD: UK Priority Monitoring Species
Originates: North-east Asian and Japan

- Generally larger than our native oyster (*Ostrea edulis*) (Figure 5)
- Obvious ribs on the upper valve
- Distinctive 'frilly' edge to the valve.
- However the appearance of both oyster species can vary widely with their environment.

Figure 5: Pacific oysters (*Magallana gigas*)

This species was first introduced into the UK for aquaculture and it was originally thought that waters in the UK would be too cold for Pacific oysters to breed successfully. However, in 1965 the first Pacific oyster was recorded in the wild and as sea temperatures rise conditions are likely to become more favourable (GB NNSS). Once established Pacific oysters can spread rapidly, forming dense reefs in the intertidal zone.

Figure 6: A reef formed by Pacific oysters (*Magallana gigas*). Source: Cornwall IFCA

Pacific oysters have historically been, and are currently, farmed at a number of sites in Cornwall. There are now well established feral populations in a number of Cornish estuaries. The origin of these populations is likely to be aquaculture stock, as well as wild settlement from feral populations in Europe (Lallias *et al.,* 2015). It is only relatively recently that Pacific oysters have become so well established, therefore the effect of the oysters on native fauna, habitats and fisheries in Cornwall remains unclear. However, Pacific oysters have reached very high densities on intertidal rock and blanketed the intertidal sediment (Figure 6) at some sites e.g. the Roseland and the Fowey Estuary. The high density of Pacific oysters on the intertidal rock in Plymouth Sound and Estuaries SAC resulted in the feature being assessed as in unfavourable condition (Natural England, 2016).

Natural England, Cornwall Wildlife Trust and the South Devon Area of Outstanding Natural Beauty are currently embarking on a two year European Maritime and Fisheries Fund (EMFF) Pacific oyster project. This is a citizen science data gathering project which will survey and map Pacific oysters across southwest marine sites. Currently it is not illegal to release, or allow Pacific oysters to escape into the wild, as legislation in 1982 (General Release License) removed Pacific oysters from Schedule 9 of the Wildlife and Countryside Act. In 2017 Cornwall IFCA updated the Fal Fishery Order 2016 regulations to prohibit the return of any Pacific oysters caught in the fishery back to the Fal Estuary live. Complete eradication of this species is not feasible and the results of the EMFF project should prove very useful for fishery and protected areas management.

[3] Available from: www.nonnativespecies.org/factsheet/factsheet.cfm?speciesId=1013 [Accessed: October 2018]

Leathery Sea Squirt[4]

Scientific name: *Styela clava*
MSFD: UK Priority Monitoring Species
Originates: North-west Pacific

- Obvious ribs on the upper valve (Figure 7)
- Narrow holdfast
- Brown body
- Up to 20 cm long
- Leathery surface containing bumps and folds

Figure 7: Leathery sea squirt (*Styela clava*). Source: Judith Oakley. https://www.marlin.ac.uk/species/detail/1883 [Accessed 28/10/2019]

GB NNSS identifies them as competition for native oysters and mussels through competition for food and the potential to smother the native shellfish. These sea squirts can also foul ropes and marine gear heavily, potentially impacting on fishing activity (GB NNSS).

Records for leathery sea squirt in the district are again focused on the Fal and Helford estuaries, although this may not be representative of their range (NBN Gateway, 2018).

In addition to the leathery sea squirt there are four other species of invasive non-native sea squirt which have been recorded in Cornwall; orange-tipped sea squirt (*Corella eumyota*), compass sea squirt (*Asterocarpa humilius*), orange cloaked sea squirt (*Botrylloides violaceus*) and creeping sea squirt (*Perophora japonica*). These invasive sea squirts are not necessarily high risk, but all have the potential to impact on fisheries and aquaculture through the heavy fouling of fishing gear and shellfish beds, as well as competing for resources with native species.

[4] Available from: http://www.nonnativespecies.org/factsheet/factsheet.cfm?speciesId=3430 [Accessed: October 2018]

Slipper Limpet[5]

Scientific name: *Crepidula fornicata*
MSFD: UK Priority Monitoring Species
Originates: North-east America

- Often found in chains with females at the bottom and males at the top (Figure 8).

Figure 8: Slipper limpets (*Crepidula fornicata*). Source: Cornwall IFCA

GB NNSS identify slipper limpets as a serious pest on mussel and oyster beds where they can outcompete native species for space and food, as well as altering the substrate (GB NNSS).

Slipper limpets were first identified in the wild in the UK in 1872 (GB NNSS). These limpets are now known to be well established in areas across the Cornwall IFCA district and a high density of records exist for the Fal and Helford Estuaries on the south coast and again a high number in the Tamar Estuary, on the border of the district (NBN Gateway, 2018). The high density of slipper limpets on the subtidal mud and mixed sediment in Plymouth Sound and Estuaries SAC resulted in the feature being assessed as in unfavourable condition (Natural England, 2016).

Fal Oyster Fishery

Slipper limpets are present at a high abundance in the Fal oyster fishery area. The first records date from the 1950's, but in the early 2000s slipper limpet numbers in the fishery appeared to increase markedly. Ecologically slipper limpets can compete with the native oysters for food and space. For the fishermen high densities of limpets makes hauling the oyster dredges more difficult, greatly increase sorting time and can cause damage to the oysters through attachment (Fitzgerald, 2007).

Figure 9: Fal Oyster Fishery boat (top) and slipper limpets collected in the Fal (bottom). Source: Cornwall IFCA

Cornwall IFCA officers carry out an annual survey of the Fal Estuary oyster beds, recording non-native species as part of this survey (Figure 9). Counting number of slipper limpets (*Crepidula fornicata*) was incorporated into this survey for the first time in 2018, previously their abundance was recorded using an abundance scale. Over the five days of surveying in 2018 11,525 slipper limpets were recorded and in 2019 11,412 slipper limpets were recorded. The effect of these slipper limpets on the oyster fishery is still not clear and currently there is no large scale use for slipper limpets locally. Initial investigations into their use for medicinal products has been conducted.

Ongoing annual monitoring by Cornwall IFCA will help to build a clearer picture of the abundance and distribution of slipper limpets in the Fal Estuary.

[5] Available from: http://www.nonnativespecies.org/factsheet/factsheet.cfm?speciesId=1028 [Accessed: October 2018]

Horizon Scanning

The following species aren't known to be usually present in the Cornwall IFCA district, but are species which if introduced have the potential to impact on fisheries. The Tamar Estuaries Biosecurity Plan (2017-2020) also identifies these species as high risk invaders to the south west (Wood *et al*., 2018). Species identified as GB NNSS alert species should be reported as soon as possible.

GB NNSS Alert species

Chinese mitten crab[6]

Scientific name: *Eriocheir sinensis*
Originates: Eastern Asia
GB NNSS Alert Species

Chinese mitten crabs (Figure 10) are native to Eastern Asia and Eastern Europe and were first recorded in the UK in 1935. The distinguishing features on these crabs are the large hair mats on their claws of adults, resembling mittens, and a notch in the middle of the rostrum. Mitten crabs can be up to 80 mm across the carapace. Chinese mitten crabs occupy freshwater, estuarine and marine habitats at different life stages and in addition to impacting habitats are likely to predate on and compete with native species (GB NNNS).

A possible pathway for introduction of these species to the Cornwall IFCA district is the import of mussel and oyster seed from areas where the crabs are established. Recently Cornwall IFCA Scientific Officers trialled a screening procedure for mitten crab in transported mussel seed. Aquaculture businesses importing seed need to ensure they have robust screening protocols for this species.

Figure 10: Chinese mitten crab (*Eriocheir sinensis*). Source: Nigel Charles, Natural History Museum (NHM). https://www.marlin.ac.uk/species/detail/2057 [Accessed 28/10/2019]

[6] Available from: http://www.nonnativespecies.org/factsheet/factsheet.cfm?speciesId=1379 [Accessed: October 2018]

Carpet sea squirt[7]

Scientific name: *Didemnum vexillum*
Originates: North-west Pacific
GB NNSS Alert Species

Carpet sea squirts (Figure 11) were only recorded in the UK in 2008 but there is real concern that this species could rapidly spread and colonise new areas. GB NNSS identifies the species as a high risk to mussel farms, with the potential to clog up other fishing gear, biofoul boats and smother native reefs (GB NNSS). This species can be very difficult to identify positively, and expert opinion should be sought.

Colonies of carpet sea squirts have been found twice in the Tamar Estuary, on the edge of the Cornwall IFCA district and been eradicated on both occasions. The species is however present in the nearby River Dart in Devon (Wood *et al*., 2017).

Figure 11: Carpet sea squirt (*Didemnum vexillum*). Source Rohan Holt, CCW. https://secure.fera.defra.gov.uk/nonnativespecies/downloadDocument.cfm?id=556. [Accessed 28/10/2019]

[7] Available from: http://www.nonnativespecies.org/index.cfm?pageid=155 [Accessed: October 2018]

American Lobster[8]

Scientific name: *Homarus americanus*
Originates: North-east America
GB NNSS Alert Species

American lobsters (Figure 12) are native to the north-east of America and were first recorded in the UK in 1988. There are at least 26 records from the UK between 1988 and 2011 but this species isn't presently thought to be established or breeding. American lobsters can be differentiated from our native lobsters primarily by their ventral tooth and red/orange tipped spines on their rostrum. GB NNSS identifies this larger species as a serious threat to our native European lobster, through competition, hybridising (resulting in sterile offspring) and potentially spreading disease (GB NNSS).

Recorded sightings of the American lobster in the UK are primarily in the south and south-west and they have been recorded at least twice in Cornwall.

Figure 12: American lobster (*Homarus americanus*) caught off Pendeen in Cornwall. Source: Cornwall IFCA

[8] Available from: http://www.nonnativespecies.org/factsheet/factsheet.cfm?speciesId=1736 [Accessed: October 2018]

Asian Shore Crabs[9]

Scientific name: *Hemigrapsus sanguineus* and *Hemigrapsus takanoi*
Originates: Western Pacific
GB NNSS Alert Species

Both species of Asian shore crab (Figure 13) are native to the western Pacific and well established in areas of Europe. There are records of Asian shore crabs from the Channel Islands in 2000 and from the UK mainland in 2014. These crabs are smaller than our native shore crab, measuring up to 45 mm (*H.sanguineus*) and 25 mm (*H.takanoi*) across the carapace, with three pointed teeth either side of their eyes.

Figure 13: Asian shore crab *Hemigrapsus sanguineus*. Source: Martin Burke, Natural History Museum. https://www.nhm.ac.uk/discover/news/2014/june/help-stem-the-asian-shore-crab-invasion.html. Accessed 28/10/2019

Both species could pose a serious threat to our native shore crab (*Carcinus maenas*) through competition. In areas of Europe *H.sanguineus*'s establishment has resulted in significant reductions in the abundance of native shore crabs and reductions in mussel density. *H.sanguineus* may also pose a threat to oyster and mussel farms and juvenile crabs could compete with the juveniles of economically important species like brown crab (*Cancer pagurus*) (GB NNSS).

[9] Available from: http://www.nonnativespecies.org/factsheet/factsheet.cfm?speciesId=3818 [Accessed: October 2018]

Existing Biosecurity Plans

Within the Cornwall IFCA district there are aquaculture facilities with mandatory biosecurity plans in place, as well as the Fal fishery which has its own biosecurity plan.

Aquaculture Facilities

The Aquatic Animal Health (England and Wales) Regulations 2009 requires all aquaculture businesses to be authorised by the Fish Health Inspectorate (FHI - Cefas). It is mandatory for all Aquaculture Production Businesses to follow good pratice regarding biosecurity and complete their own Biosecurity Measures Plan (BMP) when they apply for authorisation. This BMP must be reviewed by the FHI before a licence to operate is granted. If non-native shellfish species are to be farmed then an Alien Species Regulations (ASR) permit must also be obtained.

Whilst Cornwall IFCA can advise aquaculture businesses on screening protocols and will make businesses aware of any new risks Cornwall IFCA are aware of, the responsibility for not releasing invasive species into the wild lies with the licence holder. Businesses therefore need to ensure they regularly review their biosecurity plan and have robust screening protocols for non-native species.

If invasive non-natives are identified in stock imported into the district Cornwall IFCA should be notified as soon as possible. Likewise if a licence holder identifies non-native species in situ on their shellfish sites Cornwall IFCA should be notified as soon as possible.

Fal Fishery

The Fal fishery has it's own Biosecurity Plan in place (Cornwall IFCA, 2019).

The Fal Fishery Biosecurity Plan places emphasis on license holders to inspect their oyster beds and report any non-native species or high mortalities to Cornwall IFCA. Cornwall IFCA are then responsible for investigating these reports. Authorisation from Cornwall IFCA is required to import shellfish stock from outside of the fishery area and Cornwall IFCA are responsible for investigating the origin of such stock.

Each winter the Fal oyster monitoring survey is conducted over 3-4 days by Cornwall IFCA Scientific Officers from their research vessel. As part of this survey officers look out for invasive species or signs of mortality in the fishery. Currently slipper limpets (*Crepidula fornicata*) are known to be present at high densities in some areas of the fishery.

A contingency plan is in place if new non-native species or diseases are identified in the Fal fishery.

Southwest plans

There are already a number of biosecurity plans in the south-west, which will work together with this Cornwall IFCA plan.

- Fowey Estuary. A biosecurity plan for the Fowey Estuary has been drafted by the Fowey Estuary Partnership and is in the process of being formalised.
- The Tamar Estuaries Biosecurity Plan 2018-2020 (Wood *et al.,* 2018)

Activity with Non-Natives in Cornwall

Cornwall Wildlife Trust (CWT) currently carry out regular Shoresearch surveys across the county, including timed searches for non-native species. CWT also ran the Marine Science Project between 2012 and 2015, which raised awareness of non-native species, trained local volunteers on non-native species ID and survey, and recorded non-natives across Cornwall, including some firsts for the county and the UK.

As mentioned earlier in this report Natural England, Cornwall Wildlife Trust and South Devon Area of Outstanding Natural Beauty are working together on an EMFF funded Pacific oyster project. This project has recruited and trained volunteer groups across Cornwall's marine sites to survey Pacific oysters. As part of this project lead volunteers will also be attending non-native species training with the MBA, focusing on relevant species to the south-west. This project means regular surveys will record the presence and abundance of Pacific oysters and other chosen non-native species across Cornwall's marine sites for the duration of the project.

Surveys for non-native species are increasingly being incorporated into other citizen science shoreline surveys too. The Big Seaweed Search is one example and includes four non-native seaweeds in its targeted species. The Capturing Our Coast project ran from 2015-2018 and trained citizen scientists across Cornwall to conduct shoreline surveys, including a timed search for targeted non-native species. Verified records from these surveys will be added to the NBN Gateway.

Cornwall IFCA Biosecurity Strategy

Cornwall IFCA's own biosecurity strategy will focus on the familiar three step approach:

- Prevention of new invasive species establishing
- Early detection and rapid response to new establishments
- Long term control and management of already established species

Step 1 - Prevention

Preventing invasive non-native species from arriving in Cornish waters is the favoured approach, as long term management or eradication is very difficult and can be costly. Preventing invasive non-native species from arriving in the UK from overseas or moving between areas of the UK requires a concerted effort across multiple sectors, including shipping, aquaculture and recreational water users. Invasive non-native species may also be transported on fishing vessels and gear.

Commercial shipping and aquaculture already have regulations in place regarding biosecurity, however, the recreational boating and fishing sectors are largely unregulated in this regard. Therefore whilst the focus of Cornwall IFCA is on fisheries, it is important that Cornwall IFCA promotes good biosecurity practice right across the marine environment where opportunities arise.

Promoting good practice

There are a number of campaigns targeting recreational water users which Cornwall IFCA should promote to stakeholders and on the Cornwall IFCA website. The 'Check, Clean, Dry' campaign from the GB NNSS encourages good biosecurity practice for recreational boating and the principles apply equally to the fishing sector. This campaign is often promoted at harbours and marinas (Campaign poster in Annex 2).

- **Check** your equipment and clothing for live organisms
- **Clean** and wash all equipment, footwear and clothes thoroughly.
- **Dry** all equipment and clothing – some species can live for many days in moist conditions.

Cornwall IFCA officers should also point stakeholders to 'The Green Blue' environmental program from the Royal Yachting Association (RYA). Working closely with the GB NNSS, Environment Agency, Natural England, Natural Resources Wales, Marine Scotland and Invasive Species Ireland the RYA have developed invasive species guidance for recreational boaters. This guidance is available online[10] and on various promotional material (Campaign poster in Annex 3). The RYA have also developed a European Code of Practice on Recreational Boating and Invasive Alien Species for the Council of Europe and this was adopted into the Bern Convention in 2016.

Following Good Working Practice

Working within the fishing industry Cornwall IFCA officers have a duty to follow biosecurity best practice. Cornwall IFCA has drawn up best practice biosecurity protocols to be used by Cornwall IFCA officers and would advise that similar biosecurity practices are also followed by all those working in the fishing and aquaculture industry.

Protocols for working on the shore

- All Cornwall IFCA officers should ensure PPE (boots, oilskins, gloves) has been thoroughly cleaned and dried (since last use) before entering fishing ports and harbours or visiting stretches of shoreline to survey.

[10] Available from: www.thegreenblue.org.uk [Accessed: October 2018]

- Upon leaving sites PPE should again be cleaned down, ideally at the site, to reduce the risk of moving any invasive organisms between sites.
- Any survey gear used on shore sites should be cleaned before leaving the area, taking care to remove all sediment, seaweed and organisms.
- Any invasive species observed should be noted, photographed and their location recorded. These should then be reported to the appropriate recording body.

Protocols for working on Research Vessel (R/V) Tiger Lily VI

- When conducting surveys all equipment should be cleaned, taking care to remove all sediment, algae and organisms, before moving between survey sites. Ideally this cleaning should take place on deck at the survey site, before transiting. The deck of the vessel should also then be washed down.
- Any invasive species observed should be noted, photographed and their catch location recorded. These should then be reported to the appropriate body.
- Invasive species should not be returned to the water but disposed of properly back on land.
- All IFCA vessels should be de-fouled during their annual dry-docking for maintenance. Drying out the hull will also help to remove any attached non-native species.

Actions for Cornwall IFCA

- Where possible promote recreational boating campaigns encouraging good biosecurity practice.
- Cornwall IFCA Officers to follow and promote good biosecurity practices.

Step 2 - Early Detection and Rapid Response

Early Detection

It is inevitable that new non-native species will establish in the Cornwall IFCA district and early detection of these species is critical. Usually there is a very small window for action, before a species becomes established and starts to spread. It is therefore very important that non-native ID information and a robust and well publicised reporting system are in place. The Cornwall IFCA reporting system for stakeholders and members of the public is detailed in Annex 4 and will be publicised on the Cornwall IFCA website.

Sector	Reporting of non-native species
Marine Scientists	There is a large active network of marine and citizen scientists in Cornwall, increasing the likelihood of new invasive species being identified. The Bishop Group at the MBA in Plymouth are world leaders in non-native species and run training sessions, workshops and surveys. CWT carry out regular Shoresearch surveys across the county, including timed searches for non-native species. There are also very active voluntary marine groups across Cornwall, as well as marine science students, who carry out a variety of surveys. Marine and citizen scientists are familiar with reporting protocols and Cornwall IFCA needs to ensure it keeps up to date with their latest non-native records. The best way to do this will be to establish / maintain regular contact with the MBA Bishop lab and the CWT marine team.
Fishing and Aquaculture Industry	People working in both of these industries are very familiar with the species normally observed in local waters and are therefore likely to notice the arrival of new species into their working areas. There has recently been a trial in Wales with fishermen recording 11 INNS (Gray, 2018). Cornwall IFCA has therefore produced guidance (based on the GB NNSS ID sheets) on the high risk species for fisheries to be distributed across the sector, with information on reporting systems. This also has links to the GB NNSS website for more information. These sheets can be viewed in Annex 4 and have been distributed to approximately 300 shellfish permit holders in 2019 during the annual mail out.
Port and Harbour Authorities	Most ports and harbours are very aware of the problem of invasive species. However, it would be useful for Cornwall IFCA to also distribute the ID sheets in Annex 4 to harbours and ports across the district.
Cornwall IFCA Officers	As stated above Cornwall IFCA officers will record and report on all invasive non-native species encountered whilst surveying.

Rapid Response

A rapid response to the presence of new invasive species is required. Cornwall IFCA's response to the arrival of a new non-native species will depend on whether the species is high or low risk for fisheries. Response protocols ate detailed below:

Protocol: High Risk Species for Fisheries (Including but not limited to; Chinese mitten crab, American lobster, Asian shore crabs and carpet sea squirt)

Initial Reporting

- Cornwall IFCA to confirm the report if possible. If it needs expert confirmation then seek this from the relevant authority as soon as possible.
- Ensure the MMO and Cefas are informed of the record.
- Species should be reported to mba.ac.uk/recording/ and if they are 'alert' species also on the GB NNSS online system / email alertnonnative@ceh.ac.uk.

Further Response

- Consult with Natural England, MMO (fisheries) and Cefas (aquaculture) on appropriate response and the role CIFCA should play. Depending on the species another authority may co-ordinate the response.
- Draft species information and advice to go on the Cornwall IFCA website. This should include species identification information, details of who to contact if they are caught and advice on what to do with the specimen.
- Draft advice on relevant biosecurity measures for those in the inshore fishing industry to follow. This information will vary with species and should be drafted using best knowledge at the time.
- Email the above information to all ports and harbours for display.

Protocol: Low risk species for fisheries or species already known to be established (These reports may bypass the IFCA)

- Species should be reported as soon as possible to mba.ac.uk/recording/

Actions for Cornwall IFCA

- Distribute non-native species information to permit holders in the annual mail out. This ID guide should be reviewed and updated each year.
- Distribute this ID sheet to ports and harbours.
- Set up a biosecurity page on the website with relevant contacts for people to report new INNS.
- Investigate in a timely manner any reports of new non-native species.
- Record and report on all non-native species identified whilst out conducting surveys.
- Ensure Cornwall IFCA officers keep up to date with the latest risks posed by invasive non-native species and species records from other organisations.
- Establish contact with the Bishop lab at the MBA and maintain good links with Cornwall Wildlife Trust to keep up to date with new INNS records.

Step 3 - Long Term Control and Management

Long term control and management could potentially be an option for species which are already established, to prevent further spread within the district or to other areas. Cornwall IFCA will continue to monitor slipper limpets in the annual Fal oyster survey and will keep up to date with findings from the EMFF Pacific oyster project in the south-west.

Cornwall IFCA would not attempt to eradicate invasive non-native species, unless as part of a national program, as eradication in the marine environment is generally very costly and difficult. The effects of any eradication attempt on both the habitat and other native species would also require serious consideration.

As new non-native species establish Cornwall IFCA will need to review whether management is required.

Fish and Shellfish Disease

The introduction of finfish or shellfish disease into the Cornwall IFCA district could have severe consequences for native species. It is therefore critical that any suspected diseases or unusual/high mortalities in either aquaculture or wild stock are reported immediately to the Fish Health Inspectorate (FHI -Cefas). The FHI will then decide on appropriate action. Cornwall IFCA should also be notified at the same time (Contact details for both in Annex 1).

Actions for Cornwall IFCA

- Continue to monitor slipper limpet abundance in the annual Fal Oyster Fishery survey.
- Ensure Cornwall IFCA keeps up to date with the EMFF Pacific oyster project, particularly its final report.
- Review the management situation when new non-native species are identified. Draw up management measures if these are necessary.

Notifiable diseases

Fish	Molluscs	Crustaceans
Bacterial kidney disease (BKD) Epizootic hametopoietic necrosis (EHN) *Gyrodactylus salaris* (GS) Infectious haematopoietic necrosis (IHN) Infectious salmon anaemia (ISA) Koi herpesvirus disease (KHV) Spring viraemia of carp (SVC) Viral haemorrhagic septicaemia (VHS)	*Bonamia ostreae* (native) *Marteilia refringens* (native) *Bonamia exitiosa* (exotic) *Perkinsus marinus* (exotic) *Microcytos mackini* (exotic)	Taura syndrome Yellow head disease White spot disease

Response

The FHI (Cefas) will lead on the response to suspected fish or shellfish disease. If FHI testing confirms the presence of a notifiable disease then a Confirmed Designation will be put into place, with measures to prevent the spread of disease to other areas. Everyone who farms shellfish or fishes in the designated control area must comply with these conditions, which will include restrictions on the movements of listed fish or shellfish. Designations remain in place until they are officially revoked. Currently confirmed designations in Cornwall for shellfish:

- CD01/2015 – *Bonamia ostrae* in Cornwall and Devon
- CD06/2011 - *Marteilia refringens* in the River Tamar, Cornwall and Devon

Further information about notifiable diseases, the listed control areas in Cornwall and other current control areas can be found online[11].

Emergency Byelaws

Under Section 157 of MACA 2009 Cornwall IFCA has the power to draft an Emergency Byelaw, where there is an urgent need for one that could not reasonably have been foreseen. These powers may need to be used in the event of a serious fish or shellfish disease outbreak. If these powers are used the Secretary of State needs to be informed of the new byelaw within 24 hours and the byelaw will remain in effect for 12 months, unless revoked. With Secretary of State permission this period can be extended.

[11] Available from: www.gov.uk/guidance/report-serious-fish-or-shellfish-diseases#notifiable-fish-and-shellfish-diseases [Accessed: October 2018]

Summary

There are a number of non-native species already established in the Cornwall IFCA district with the potential to impact negatively on fisheries. These include: Pacific oysters, slipper limpets and leathery sea squirts. There are also a number of high risk species with the potential to impact on fisheries if introduced, including: American lobster, Chinese mitten crab, Asian shore crabs and carpet sea squirt. This is not an exhaustive list and the situation needs constant review.

A number of actions have been identified for Cornwall IFCA in this biosecurity plan, following the three tier approach of prevention, early detection and long term control:

Prevention of new species establishing
• Promote recreational boating campaigns encouraging good biosecurity practice. • Cornwall IFCA Officers to follow and promote good biosecurity practice when surveying on the shore or at sea.
Early detection and rapid response
• Produce a species ID guide for fisheries related INNS to be distributed to fishermen in the annual mail out. This guide should be reviewed and updated each year. • Set up a biosecurity page on the website with relevant contacts for people to report new INNS. • Investigate in a timely manner any reports of new non-native species. • Record and report on all non-native species identified whilst out conducting surveys. • Ensure Cornwall IFCA officers keep up to date with the latest risks posed by invasive non-native species and species records from other organisations. • Establish contact with the Bishop lab at the MBA to keep up to date with new INNS records. • Publicise information about reporting fish and shellfish disease to the FHI on the Cornwall IFCA website.
Long term control and management
• Continue to monitor slipper limpet abundance in the annual Fal Oyster Fishery survey. • Ensure Cornwall IFCA keeps up to date with the EMFF Pacific oyster project, particularly its final report. • Review the management situation when new non-native species are identified. Draw up management measures if these are necessary.

Review

The situation with invasive non-native species is constantly changing and this plan will need to be reviewed at least every five years. This should include:

- A review of the recorded fisheries non-native species recorded in the district.
- Assessment of the effectiveness of Cornwall IFCA biosecurity working protocols and reporting protocols
- Identifying whether more work is needed with stakeholders.
- Identifying whether more work is needed with partner organisations.
- A review of management measures for established non-native species and the drawing up of any new management measures.

In the event of high-risk fisheries species arriving in the UK and the Cornwall IFCA district, or the outbreak of a serious shellfish disease, this plan will need earlier review. Small amendments to the plan may also need to be made before the five year review.

Acknowledgments

The Great Britain Non-Native Species Secretariat website is one of the most comprehensive information sources on non-native species and has been used to inform many sections of this plan. In some instances it has been referenced directly, however, all information on the website can be accessed at: www.nonnativespecies.org

The MBA are leaders in non-native species and more information about their work and links to their publications can be found at www.mba.ac.uk/fellows/bishop-group-associate-fellow. The MBA's guide to species in the Tamar has been very helpful in the construction of this plan and the MBA should be referenced appropriately throughout the document.

The North West IFCA Biosecurity plan has been extremely helpful in the completion of this biosecurity plan and can be viewed at www.nw-ifca.gov.uk/biosecurity/

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Annex 1 – Contact Details

Cornwall IFCA
Office 2, Chi Gallos,
Hayle Marine Renewables Park
North Quay
Hayle
01736 336 842 / enquiries@cornwall-ifca.gov.uk

Fish Heath Inspectorate (Cefas)

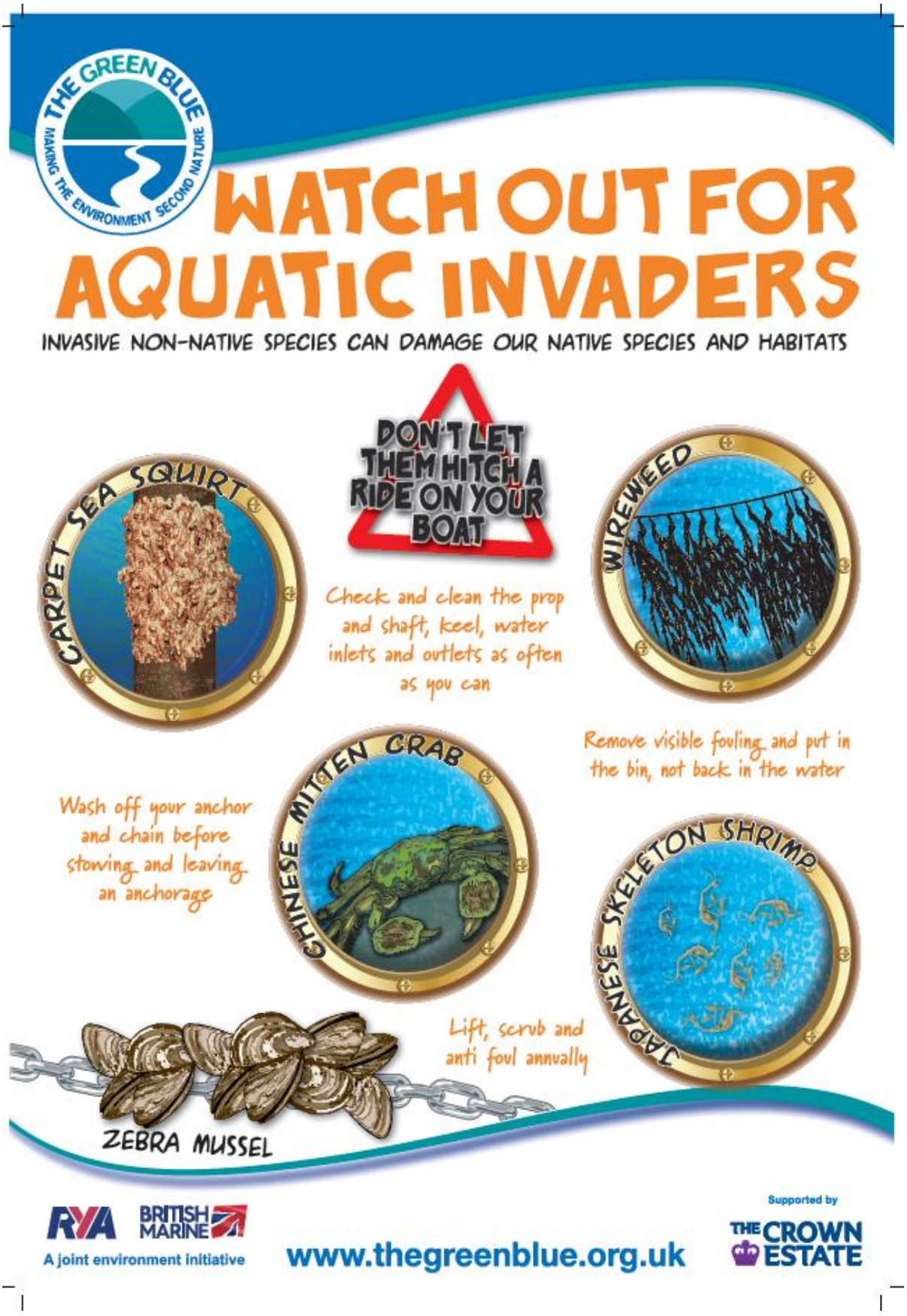
Fish Health Inspectorate
Barrack Road
The Nothe
Weymouth
Dorset
DT4 8UB
01305 206 700 / fhi@cefas.co.uk

Cornwall Port Health

Port Health Office
The Docks
Falmouth
Cornwall
TR11 4NR
01872 323090 / porthealth@cornwall.gov.uk

Annex 2 – GB NNSS Check, Clean, Dry Campaign Poster

Annex 3 – RYA The Green Blue Campaign Poster



Annex 4 – ID sheets distributed to fishermen (summarised from GB INNS sheets)

Cornwall IFCA Guide to Non-Native Species

Some non-native species have the potential to seriously impact on the fishing industry through fouling fishing gear, changing habitats, competing with our native species or introducing disease.

The following species are not a complete list but just some of the non-native species that could impact the local fishing industry. If you see these species, or other new species, please report them as soon as possible to Cornwall IFCA at enquiries@cornwall-ifca.gov.uk (FAO Research Team) or on 01736 336 842. Please try to take a photograph, record the date, location, number of individuals and sex (if distinguishable).

Please do not release non-native species back into the wild, this is a criminal offence

American Lobster

- 'Ventral tooth'
- Red tipped spines on rostrum
- Olive green/greenish brown in colour
- Underside of claws usually orange-red
- Tends to be larger than native lobster

Chinese Mitten Crab

- Notch at the front of carapace
- Dense mats of hair on claws
- More square in shape than shore crab
- Long, hairy legs
- Up to 80mm across carapace

Carpet Sea Squirt

- Appears translucent
- Tube like bodies on surface
- Dark 'veins' with pores on surface
- Variable colour; white/cream/brown
- Firm, smooth texture
- May form mats over fishing gear

This species can be very difficult to identify. If you suspect it is present please take photographs and email them to Cornwall IFCA who will seek expert confirmation.

Asian Shore Crabs

There are two species of Asian shore crab

Hemigrapsus sanguineus

- Carapace nearly straight between eyes
- Square shaped carapace, with 3 pointed teeth on each side
- Up to 45mm across carapace
- Banding on legs
- Dark purple, red or brown spots on the upper side of pincers

Hemigrapsus takanoi

- Carapace nearly straight between eyes
- Square shaped carapace, with 3 pointed teeth on each side
- Up to 25mm across carapace
- Often has tiny dark spots on parts of body and claws

Thank you for reporting your sightings.

All species ID information is from the GB Non-Native Species Secretariat portal and ID sheets.
For more information please visit: www.nonnativespecies.org

Annex 5 – Public Reporting Protocol

Reporting protocol for Invasive Non-Native Species

Cornwall IFCA
Inshore Fisheries and Conservation Authority

Species should be photographed if possible and reported to the contacts below, with the date, location, number of individuals and sex (if distinguishable). Please do not release any non-native species back into the wild - this is a criminal offence.

Please send these records by email to **enquiries@cornwall-ifca.gov.uk** and marked **FAO Research Team** or call the Cornwall IFCA office on **01736 336 842**.

Species of particular interest include; Chinese mitten crabs, American lobster, Asian shore crabs and carpet sea squirts.

Thank you for reporting your sightings.