



Department  
for Environment  
Food & Rural Affairs

# **England aquatic animal health strategy: Rationale and next steps**

**December 2015**



© Crown copyright 2015

You may re-use this information (excluding logos) free of charge in any format or medium, under the terms of the Open Government Licence v.3. To view this licence visit [www.nationalarchives.gov.uk/doc/open-government-licence/version/3/](http://www.nationalarchives.gov.uk/doc/open-government-licence/version/3/) or email [PSI@nationalarchives.gsi.gov.uk](mailto:PSI@nationalarchives.gsi.gov.uk)

This publication is available at [www.gov.uk/government/publications](http://www.gov.uk/government/publications)

Any enquiries regarding this publication should be sent to us at

[AAH@defra.gsi.gov.uk](mailto:AAH@defra.gsi.gov.uk)

PB 14334

## Contents

Foreword.....	1
Executive summary .....	2
Introduction .....	2
Aim .....	2
The challenge.....	2
Governance.....	4
Scope.....	4
Welfare.....	5
Vision for the future.....	5
Working together .....	5
Working effectively in the EU and internationally .....	6
Our priorities .....	7
Reducing the risk that disease might be introduced.....	7
Reducing the impact if disease is introduced .....	8
Providing high quality advice and guidance to industry .....	9
Rapid detection, characterisation and control of emerging diseases .....	10
Maintaining and improving capability to detect, identify and study disease.....	11
Conclusion .....	12
Endnotes .....	14

# Foreword

For the first time Defra, in partnership with industry, has set out its strategic aims and objectives for aquatic animal health, to cover the next five years. This companion document explains the rationale for the strategy in more detail and sets out the next steps towards achieving the aims of the strategy.

The Government recognises the value of the aquatic sector to the economy, society and the environment. Real benefits can be achieved by protecting and improving the health of our farmed, wild migratory and freshwater fish, and shellfish; aquatic disease outbreaks threaten trade and profitability, the natural environment and important recreational activities such as angling.

Significant developments at EU level have been made in recent years. Sustainable growth of aquaculture has gained new impetus with Member States required to produce Multiannual National Plans outlining how they intend to foster growth in the aquaculture industry. Government is committed to supporting industry-led development.

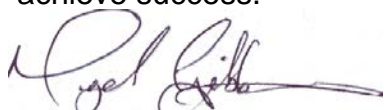
The new Animal Health Regulation will establish a single simplified regulatory framework setting down the principles of European animal health for the next 20 years. We will continue to work with the industry through those negotiations and future implementation.

There are challenges ahead that we must be prepared to meet. For example antimicrobial resistance is an area of importance for both human and animal health. While aquaculture has demonstrated a decreasing trend for antibiotic use we must remain vigilant and continue to support and encourage the responsible use of antibiotics in this sector.

Longer term, climate change is likely to impact aquaculture with specific pathogens more easily able to establish as water temperatures increase. This strategy sets out our approach to these challenges, and a commitment to develop policies and deliver results in partnership with industry and interested parties.

I would like to thank all those who have helped shape the strategy, the Animal Health and Welfare Board for England for their support and especially the various agencies and stakeholders for their helpful and robust contributions.

Finally, it is important to recognise we can only take the strategy forward on a partnership basis. All of us, industry, interested parties and Government alike have a role to play and responsibilities when it comes to the management of aquatic animal health. Much work has already been done to build a collaborative approach and deliver outcomes jointly but we will need to build on and strengthen existing partnerships over the coming years to achieve success.



**Nigel Gibbens, Chief Veterinary Officer UK**

# Executive summary

Maintaining a high aquatic animal health status is important in order to provide an environment where aquaculture production can take place without being impacted by production losses from disease. It is equally important to maintain healthy wild fish and shellfish populations.

The strategy sets out some challenging aims, for Government, industry and all interested stakeholders to protect and improve aquatic animal health in England. It encompasses a 5 year programme of work aimed towards clear outcomes. The strategy's priorities are:

- Reducing the risk that disease might be introduced
- Reducing impact if disease is introduced
- Providing high quality advice and guidance to industry
- Rapid detection, characterisation and control of emerging diseases
- Maintaining and improving capability to detect, identify and study disease

Everybody stands to benefit from successful delivery of the strategy. The vision is for Government and all those with an interest in aquatic animal health to work in partnership to achieve these aims.

## Introduction

### Aim

1.1 The overall aim of the strategy is to:

**Maintain England's high aquatic animal health status by preventing the introduction and spread of aquatic animal disease, minimising the impact of endemic disease, while protecting the environment and helping ensure a sustainable aquaculture industry.**

### The challenge

1.2 England has a high aquatic animal health status, being free from many of the most serious aquatic animal diseases compared with most of Europe and many other regions of the world. This status has resulted from a combination of geographical location and long standing legislation on fish and shellfish health.

1.3 Aquatic animals are a valuable resource, contributing to growth and jobs in rural and coastal communities as well as the wider economy. The introduction of aquatic pathogens can cause major economic losses for aquaculture businesses (increased

mortality, treatment), environmental damage, biodiversity loss as well as impacting other industries which rely on them e.g. angling and restocking of angling waters. Freshwater fisheries make a major contribution to our natural and social heritage and expenditure by anglers in England and Wales supports about a billion pounds of household income equating to 37,000 full-time jobs\*

1.4 Aquaculture has an important part to play in meeting the demand for a sustainable supply of fish and seafood. Exports of fish and crustaceans from the UK reached £1.6b in 2014, with trade in ornamental fish alone worth about £150 million each year\*\* Disease freedom underpins international regulations on the trade in live animals and their products. The maintenance and protection of our health status safeguards the interest of all stakeholders as well as the public who derive health and wellbeing benefits from angling and other recreational activities.

1.5 Maintaining our high health status, keeping out new diseases and being prepared to deal with any incursions quickly and effectively, while protecting wild populations is our main challenge. While we have legislative controls in place with the overall purpose of preventing the introduction and spread of infectious disease, we must ensure that these measures do not represent unjustified barriers to trade and that we comply with our EU obligations. In addition, we want to raise standards of aquaculture health and minimise the impact of existing disease problems such as koi herpes virus disease<sup>1</sup> (KHV).

1.6 The costs of aquatic animal disease should not be underestimated. The outbreak of the exotic disease viral haemorrhagic septicaemia<sup>2</sup> (VHS) in 2006 that affected one farm was estimated to have cost Government and wider industry over £1.2 million. Industry has a crucial role to play in the prevention of disease and retain primary responsibility for their stock health.

1.7 The limited number of medicines licensed for use in fish is a growing concern amongst industry. While it is recognised that the inappropriate use of antimicrobials is bad practice, antibiotics may be the only effective means of treating some bacterial diseases. Although fish diseases do not affect human health, shellfish in particular can carry biotoxins, viruses and bacteria which are potentially harmful and pose economic risks to the shellfish industry. Sanitary controls on the production of bivalve shellfish are necessary to protect public health.

1.8 As aquaculture in England develops, the threat and potential impact of disease on farmed and wild stocks grows. It will be increasingly important that high standards of biosecurity are maintained. Government and industry will continue to work together to help achieve this.

\* The economic impact of freshwater angling in England & Wales. Environment Agency Science Report – SC050026/SR2

\*\* OATA figures presented at Defra Aquatic Animal Health stakeholder meeting (March 2015)

1.9 The drive to reduce central government spending is changing the way we work. In the face of increasing pressure on government resources we need new and more cost-effective ways of working between government, industry and with all external partners to deliver our shared priorities more efficiently and with maximum value.

## Governance

1.10 European Union Council [Directive 2006/88/EC](#) provides the legislative framework for the control of serious diseases of fish, shellfish and crustaceans.

1.11 Aquatic animal health policy in the UK is a devolved matter. The [Fish Health Inspectorate](#) (FHI) is the official service responsible for the prevention and control of aquatic animal disease within England. This involves enforcing the [Aquatic Animal Health Regulations \(England and Wales\) 2009](#). Scotland and Northern Ireland have separate but parallel regulations.

1.12 The Centre for Environment, Fisheries and Aquaculture Science ([CEFAS](#)) is an Executive Agency of Defra providing epidemiological, scientific and veterinary advice on fish and shellfish health and investigation of emerging aquatic animal diseases.

1.13 The [Animal Health and Welfare Board for England](#) (AHWBE) advises Defra ministers on all strategic health and welfare matters relating to all kept animals in England.

1.14 This strategy is aligned with the Defra food and farming strategy in that it aims to minimise the impact of endemic diseases, reduce the risks of disease incursion and facilitate rapid eradication where diseases are introduced.

## Scope

2.1 This strategy is for England only but there will be close liaison with Wales, Scotland, Northern Ireland and the relevant agencies in these countries.

2.2 The strategy covers the health of aquatic animals both in aquaculture and wild stocks (where the environmental situation may impinge on the health status of aquaculture animals). The strategy also covers the health of animals transported to, from and within England.

2.3 The strategy builds on the current animal health legal framework and the standards and guidelines of the [World Organisation for Animal Health](#) (OIE). It will guide the development of new policies or guidelines and will enhance existing animal health arrangements in England based on scientific risk assessments and taking into account social and economic considerations. It will support the achievement of a high level of environmental protection by considering the impacts on the environment in the development of the policy framework.

## Welfare

2.4 Good welfare is fundamental to all aspects of fish management, affecting health, survival, productivity and final product quality. While outside the scope of this strategy, anyone responsible for fish has a duty of care to meet acceptable animal health and welfare standards. The [Farm Animal Welfare Committee](#) is Government's independent advisory body on animal welfare and has published [reports](#) specific to fish welfare. Fish farmers and the aquaculture industry as a whole have made many improvements to the welfare of farmed fish including adopting universal codes of practice<sup>3</sup>.

## Vision for the future

3.1 Our vision is for Government and industry to work in partnership to prevent aquatic animal health related problems, to maintain a cost effective regime for aquatic animal health, and to ensure we have the skills and capability to deal swiftly with new or emerging disease threats. It provides direction for the development of aquatic animal health policy, based on shared responsibility with stakeholders. Policies will be proportionate and balanced against risk and the implications for the environment, economy and society.

The vision is linked to Defra's five-year strategy and purpose: 'Unleashing the potential of food and farming, nature and the countryside, championing the environment and protecting us all from natural threats and hazards' and to the underlying objectives;

- A cleaner, healthier environment which benefits people and the economy
- A world-leading food and farming industry
- Excellent delivery, on time and to budget and with outstanding value for money
- A nation protected against natural threats and hazards, with strong response and recovery capabilities
- A thriving rural economy, contributing to national prosperity and wellbeing
- An organisation continually striving to be the best, focused on outcomes and constantly challenging itself

## Working together

4.1 Defra and Cefas work closely with stakeholder groups, vets, academics, other agencies and administrations in the development of policy and consult on major changes to the legislative framework on aquatic animal health. Collaborative activities are broad ranging and include:

- a. Defra's annual aquatic animal health stakeholder meeting provides a forum for Government and industry to engage over aquatic animal health issues, supplemented by ad-hoc discussions and meetings.



- b. The Fish Health Inspectorate (FHI) works closely with the aquaculture industry, the ornamental fish trade, fishery managers and relevant trade associations when delivering its compliance and surveillance programme. The FHI has extensive interaction with industry through regular inspection of Aquaculture Production Businesses (APBs).
- c. Defra works in partnership with the Devolved Administrations, Cefas and other agencies to share information, risk assessments and ideas on improving the management of aquatic animal health across the UK.
- d. Importantly, stakeholders undertake work which although not directed by the Government contributes to our priorities<sup>4</sup>. Industry organisations have developed codes of practice which promote animal health and welfare, trade bodies supply sector specific advice and guidance and stakeholder led initiatives contribute to the protection of our health status.
- e. The competent authorities and official services in England and Wales, Scotland and Northern Ireland hold annual meetings in order to consider evolving policy issues, to share good practice and ensure that standards of delivery are consistent across the administrations.
- f. The FHI works closely with colleagues in the [Animal and Plant Health Agency](#) (APHA) and UK [Border Force](#) (UKBF) in the delivery and enforcement of border controls and checks to protect our national biosecurity.
- g. The FHI work in cooperation with the [Environment Agency](#) (EA) in the investigation of mortality events in fisheries<sup>5</sup> ensuring the best and most appropriate advice is given to affected fisheries, helping their rapid recovery.

## Working effectively in the EU and internationally

5.1 Defra works with Cefas to collectively engage with the EU and international partners to ensure that the UK is seen as a visible and reputable player in the expertise, improvement and overall policy management of aquatic animal health. Activities include:

- a. Defra represents UK Government at official [EU negotiations](#) utilising expert advice from Cefas. The UK has a very active role within the EU in reviewing proposed changes to aquatic animal health legislation through engagement in EU Expert working groups.
- b. Cefas is the [European Reference laboratory](#) for crustacean diseases which involves active involvement with National Reference Laboratories in all Member States.

- c. Internationally, Cefas works with the OIE by having a [Collaborating Centre](#) for information on aquatic animal disease and OIE reference laboratory status for three listed diseases.
- d. Cefas have contacts and collaborations around the world which act as an informal network communicating information about disease emergence and spread as well as strategic collaborations with research institutions that provide access to fundamental research.
- e. Cefas staff regularly participate in OIE working groups (for example on listing of diseases and criteria for susceptibility) and take a leading role within the EU in reviewing proposed changes to [OIE's aquatic animal health standards](#).
- f. Industry organisations<sup>6</sup> provide a crucial challenge function, lobbying Government and associated bodies to ensure policies do not cause unnecessary burdens or have unintended consequences. Core stakeholders and other groups independently consider issues of concern to the wider stakeholder community.

## Our priorities

### Reducing the risk that disease might be introduced

6.1 The global trade in live aquatic animals and their products provides a route for disease introduction that not only threatens aquatic animal health but can have a serious impact on international trade, aquaculture businesses and biodiversity. For example the introduction of non-native species such as signal crayfish, infected with crayfish plague, devastated stocks of indigenous crayfish. The FHI works closely with APHA staff at Border Inspection Posts<sup>7</sup> and fish importers to prevent introduction of disease, undertaking physical and documentary checks<sup>8</sup> and targeted surveillance of imported live fish<sup>9</sup>. All fish and shellfish farms must be authorised<sup>10</sup> by the FHI and are required to operate in accordance with an approved biosecurity measures plan<sup>11</sup>. A key strand of research has been the assessment of pathways of introduction of exotic pathogens<sup>12</sup> or import risk analysis.

### Future outcomes

- **Mitigating the risks from imported fish** - the implementation of Regulation 18 of the Aquatic Animal Health Regulations provides additional safeguards. From the 1 April 2014, the import of fish intended for introduction into the wild or for restocking angling waters is restricted to fish from sources declared disease free and which have not been vaccinated against any of the EU listed diseases. The continued application of Regulation 18 provides a valuable mechanism for the control of outbreaks of listed diseases, improves national biosecurity, and will contribute to the protection of our high health status.

- **Partnership to prevent disease incursion** - the FHI will continue to run an enforcement programme aimed at preventing the illegal importation of aquatic animals. A partnership with the 'Crimestoppers' charity which led to a network of responsible anglers anonymously reporting suspicious activity via the Charity's hotlines will continue, helping in the fight against illegally smuggled fish,
- **Improved cooperation with other Government Agencies to facilitate joint investigations** - in the future there will be greater emphasis on undertaking joint investigations into possible breaches of legislation where there are common interests across the legislative framework. The FHI is already engaged with agencies such as [Inshore Fisheries and Conservation Authorities](#) (IFCA), the EA, Local Authorities, and the Police in joint investigations. Improved cooperation with UKBF at points of import will serve to tackle illegal smuggling of fish<sup>13</sup>.
- **Evidence to support biosecurity measures** - the knowledge and attitudes of fish farmers and fishery owners towards biosecurity will be assessed. Current use of disinfectants will be evaluated through interviews with fishery owners and farmers along with analysis of field samples to determine the effectiveness of disinfectant baths present at fisheries and farms. Results will help to better quantify the risk of transmitting pathogens between sites on contaminated equipment.

## Reducing the impact if disease is introduced

6.2 Recovering from a disease outbreak can take a long time and be very expensive. Early detection is fundamental to reducing the impact of disease incursion. The FHI carry out risk based surveillance<sup>14</sup> on aquaculture production businesses for all EU listed diseases, which is underpinned by the 'Starfish' database<sup>15</sup>. Prompt reporting of abnormal mortality<sup>16</sup> is essential to ensure that any outbreaks are rapidly contained<sup>17</sup>. Preparedness in the event of an emergency – such as the introduction of an exotic disease – is one of the essential elements in protecting aquatic animal health. Defra, working with Cefas, the EA and other partners, regularly undertakes contingency exercises to ensure processes and procedures are in place to deal effectively with disease outbreaks<sup>18</sup>. Where outbreaks do occur, Government acts to lessen the direct costs on aquaculture businesses<sup>19</sup>. In many cases there are measures fisheries and aquaculture businesses can take to minimise impacts such as good management practices and introducing biosecurity measures<sup>20</sup>.

### Future outcomes

- **Improved surveillance methods** - the relative contributions of active (specific activities targeting certain diseases) and passive (reliance on signs of disease being reported if they occur) surveillance to early detection of disease will be modelled to inform future surveillance programmes, improving our capacity to both detect and control disease incursions. Mobile phone applications (developed under

complementary projects) will allow anglers to report the occurrence of fish species, disease and mortality, thus creating an additional element to passive surveillance.

- **Serology as a tool for surveillance** - the interaction between specific pathogens and their hosts in the environment is central to understanding disease outbreaks and spread. Improving serological tools offers opportunities for better surveillance.
- **Enhanced tools for disease control** - mathematical models and hydrological geographical information system (GIS) applications from previous Defra funded projects will be further developed to support decisions about the control of listed diseases – specifically to provide evidence for potential zoning of designated areas around infected farms. The control and/or eradication of the parasite *Gyrodactylus salaris*<sup>21</sup> (GS) were it to be introduced to English rivers presents certain challenges. The effectiveness of non-chemical control methods (e.g. electrofishing and barriers to migration) to reduce parasite numbers and ultimately achieve eradication of GS will be evaluated in different types of river system using models.
- **Robust and tested contingency plans in place** - each contingency exercise is assessed and an evaluation report produced. These reports are used to highlight and promote best practice and lessons learned and to review and update contingency plans as appropriate. Important collaborations with industry and other government agencies will be strengthened.

## Providing high quality advice and guidance to industry

6.3 Practical, evidence-based information and advice will help fishery owners and aquaculture operators maintain high standards of aquatic animal health - preventing the losses that damage fisheries and businesses, and ensuring good cooperation. Cefas researchers and FHI inspectors regularly attend trade conferences and meetings, presenting and disseminating information and guidance to industry<sup>22</sup>. The FHI has built upon this through the provision of advice and guidance to industry and to the public in general on areas such as aquatic animal diseases, biosecurity measures, and disease risk mitigation. Industry guidance<sup>23</sup> is also instrumental in promoting and protecting aquatic animal health across such a diverse sector.

### Future outcomes

- **Dissemination of information to stakeholders** – continued sharing of aquatic animal health information and practical ways to reduce disease risk which will be available on dedicated web pages on the central Government website [www.Gov.UK](http://www.Gov.UK).
- **Use of social media** - the development of a new FHI Facebook page and Cefas Twitter account will ensure timely publication of updates on disease outbreaks and other relevant information. The 'Finfish News' and 'Shellfish News' publications

which disseminate aquaculture statistics, reports, and the latest research findings, are changing to an improved blog format ensuring a continuous flow of updates.

- **Biosecurity advice** - a better understanding of barriers to the uptake of biosecurity by farmers will help target advice. Knowledge and attitudes of fish farmers towards biosecurity will be assessed through interviews, workshops and analysis of working footbaths, and used to develop guidance and information campaigns for stakeholders to support greater investment in and improved biosecurity practices.
- **Emerging disease conference** - Cefas initiated the inaugural UK and Ireland European Association of Fish Pathologists conference, 'Fish and Shellfish Health: Future Challenges', held at the University of Keele, attracting participation from abroad and UK industry. This conference is now planned to be held biennially at locations across the UK, providing an excellent means to bring together scientists and stakeholders to discuss current issues affecting the aquaculture industry.

## Rapid detection, characterisation and control of emerging diseases

6.4 New or unidentified diseases emerge in the aquatic environment on a frequent basis. It is important to quickly identify the potential threat<sup>24</sup> to farmed and wild stocks as well as to public health. Determining the causes and impact of disease requires specialist laboratory facilities and investigation (field and experimental studies)<sup>25</sup>. The information gathered provides an evidence base<sup>26</sup> to inform any decision for government intervention. While the exact cause and significance of emerging diseases may not be fully known it is important to advise and raise awareness of developing situations with industry so the most up to date information can feed into management practices<sup>27</sup>. In recent years a number of skin conditions have affected the trout farming industry, in particular red mark syndrome (RMS) and puffy skin<sup>28</sup> (PS).

### Future outcomes

- **Awareness of global emerging disease threats** – Cefas will maintain a daily monitoring programme for emerging diseases reported around the world using e-surveillance established networks. Maintenance of the 'International Database on Aquatic Animal Disease (IDAAD)' under the OIE Collaborating Centre will ensure awareness of potential disease threats.
- **Improved understanding of pathogen lifecycles in the environment** – knowledge on the role of vector species in disease transmission and persistence of pathogens in the environment will be used to improve assessment of disease risk and to identify potential for disease avoidance.

- **Maintaining reference collections** – a crucial resource for reference and training. Samples of pathogens will be added to existing collections of microbial and parasitic material and include histological slides showing characteristic pathological changes.
- **Improved molecular detection of cryptic infections and localising them in the host** – improved capability for genome sequencing and building expertise in bioinformatics<sup>29</sup> provides the means to identify potential pathogen involvement in a number of conditions.

## Maintaining and improving capability to detect, identify and study disease

6.5 Having the right skills and tools available is essential to protect aquatic animal health and underpins all five of our priorities<sup>30</sup>. The maintenance of aquatic animal health expertise as well as key diagnostic functions will ensure we are efficient and effective in our work. Recent years have seen an exponential increase in our capacity to obtain DNA sequence data from whole organisms or environments. This capacity is set to impact how we detect, identify and study disease agents in the environment and how we assess their risk to aquatic animal health. Developments in diagnostics open up the possibility for pen-side testing and environmental DNA (eDNA) testing for both pathogens and invasive species.

6.6 An integrated approach for disease diagnosis is also essential. New molecular tools are increasingly being used to identify and discriminate between pathogen species and strains.

6.7 Increasingly large data sets are required to support evidence-based policy development. This is because the questions that need to be addressed are directed at large spatial and temporal scales (e.g. the impact of climate change). Developments in mobile technology and particularly the advent of GPS-enabled smart phones are providing important new opportunities for the collection of environmental data through 'citizen science' projects.

### Future outcomes

- **Capability for characterisation of diverse pathogen groups** – a diverse skill base and specialist equipment for, viral, bacterial, fungal and parasitic detection and characterisation together with bespoke aquarium facilities will be maintained.
- **Application of next generation sequencing** – high throughput sequencing (HTS) methods will be applied to pathogen groups infecting commercial shellfish, allowing for comparison of strains from different hosts, locations and disease status. HTS combined with other molecular diagnostic tools will be used to validate the potential

role of eDNA in pathogen detection and assess its potential integration into surveillance.

- **Modelling the economic impacts of an outbreak** – an understanding of the economic impact of disease incursion for both industry and government is critical for decision making. Working with Defra economists and others Cefas will develop farm and catchment level economic models to assess both ex-ante and during an outbreak the direct costs of disease and different government control options.
- **Smartphone app for anglers** – Cefas is developing a smart phone app to engage anglers as citizen scientists to map the distribution and health of wild freshwater and marine fish. Over time this will contribute to the achievement of a number of key scientific objectives and provide a means through which to identify fish populations in decline or under threat from pathogens and pests, allowing for surveillance efforts to be targeted efficiently and effectively<sup>31</sup>.
- **Electronic data collection in the field** – the use of tablets by Fish Health Inspectors will enable more efficient data collection in the field, including automatic data validation.

## Conclusion

7.1 This Strategy sets out the aquatic animal health priorities and the steps we are taking to meet our goals. We will monitor outcomes and build on these to ensure we retain the flexibility to respond to changing policy and operational needs as well as supporting the longer term direction of aquatic animal health policy.

7.2 While there are many examples of partnership in action under the current regime we must take advantage of existing collaborations, encourage new initiatives and make more use of non-legislative alternatives to regulation. By strengthening our evidence in strategically important areas, we will continue to meet policy needs and deliver value for money. For example, improved taxonomy for listed diseases will strengthen our ability to influence negotiations at OIE and EU level. Tapping into initiatives like Citizen Science - a partnership between volunteers and scientists to answer real world questions - is one way to develop the evidence-base in a cost effective way. Increasing stakeholder engagement and feedback so that views and concerns are taken into account in making policy decisions on priorities will be key to this process.

7.3 The ability to diagnose and assess the risk of emerging diseases is paramount and retaining the core skills required for this will remain a priority. Cefas will deliver this through training plans and engaging in related non-government funded work. Opportunities to undertake cross cutting approaches on animal health issues will also be sought such as the integration of social science into biosecurity and modelling work.

7.4 In addition to technical capability a key focus over the next few years will be the development of EU proposals. Establishment of a single, simplified regulatory framework for animal health<sup>32</sup> is an opportunity to simplify animal health legislation and make it easier to use for everyone involved while providing Member States with the flexibility to manage animal health risks appropriately.

7.5 We will exploit synergies and opportunities in related developments such as the EU [Blue Growth Strategy](#) which aims to promote aquaculture. Under the 2020 strategic programme there are funds for research and innovation to increase efficiency, productivity, increase the number of farming species and move production further off shore.

7.6 Implementation of the strategy will be monitored regularly and reported on within 3 years of publication.



## Endnotes

---

<sup>1</sup> **Koi herpesvirus (KHV) disease** is a virulent, temperature dependent disease that affects common carp *Cyprinus carpio* and its variants. KHV disease was first identified and characterised in 1998 in the USA in ex-Israeli koi carp. The disease was first identified in the UK in imported ornamental koi in 2000, and in subsequent years emerged as an important disease in the ornamental fish sector to the extent that it resulted in a decline in trade in susceptible species. KHV disease first emerged in managed fisheries in England in 2003 where it has caused extensive mortality in carp populations.

<sup>2</sup> **Viral haemorrhagic septicaemia (VHS)** has been a major cause of production loss in European trout production. There are no movements of live trout or salmon into the UK due to our VHS-free status. The most likely route of introduction is via imported fish products from Europe for processing.

<sup>3</sup> Established over a decade ago, **Quality Trout UK** is an example of an industry developed quality assurance scheme for trout farming in the UK. The standard is designed to ensure the highest standards in farmed trout production, addressing traceability, product quality, food safety, fish health and welfare and best farming practice throughout the supply chain.

<sup>4</sup> **Voluntary Bailiff Service** - the Angling Trust envisaged and established the Voluntary Bailiff Service: an important partnership with the Environment Agency where carefully selected and trained volunteers support the work of Fishery Enforcement Officers. Using local knowledge and presence on river catchments volunteers will support the fight against poachers and fish thieves helping prevent illegal movements of fish. The first successful applicants were inducted in May and September 2012 receiving specialised training including intelligence gathering and reporting incidents. At present this is a pilot project in the South East of England but it is hoped to roll it out nationally in due course.

<sup>5</sup> **Joint Agency working** - a new virus affecting common carp was first detected in fisheries in south-east England in 2012 and later in fisheries in the Midlands. The virus has some similarities to carp edema virus (CEV), a pox virus which causes koi sleepy disease) but shows sufficient genetic differences to indicate it is a different virus. The Environment Agency imposed immediate controls to protect carp fisheries, providing management advice to owners on how to minimise losses. Work is ongoing with virologists at Cefas to further understand the virus and the risk it poses to fisheries. Some similarities with spring carp mortality syndrome (SCMS), an earlier EA study, have led to a new line of investigation. Cefas in collaboration with EA are reviewing historic mortality cases to help understand the distribution and importance of this CEV-like virus. Testing for CEV-like virus has been incorporated into the standard suite of diagnostic tests used when investigating coarse fish mortality events.

<sup>6</sup> Aquatic animal health is a diverse policy area not represented by any single overarching organisation. **Core stakeholder groups** engaged with Government include the [Angling Trust](#), the [British Trout Association](#), the [Ornamental Aquatic Trade Association](#), and the [Shellfish Association of Great Britain](#) (SAGB). There are other groups and NGOs active in the sector.

<sup>7</sup> All consignments must enter the EU via a **Border Inspection Post (BIP)** approved for clearance of live fish, molluscs and crustaceans.

<sup>8</sup> All movements into England must be accompanied by the appropriate **EU animal health certificate**, signed by the competent authority in the country of origin which attests to a disease status equivalent to or higher than England. The FHI carry out document checks where health certificates are required, and take appropriate action if problems are identified.

---

<sup>9</sup> The FHI run an **annual import sampling programme** where inspectors sample consignments of imported susceptible species at their point of destination.

<sup>10</sup> All **importers** of live fish, molluscs and crustaceans (except those intended for human consumption) must be authorised by the FHI.

<sup>11</sup> A condition of authorisation is the requirement to operate in accordance with an approved **biosecurity measures plan** (BMP). The purpose of the plan is to reduce the risk of disease introduction to the farm, the potential spread of disease from the farm, and to improve the overall health of the stock - APBs are inspected for compliance against their documented BMP.

<sup>12</sup> The import of contaminated product for processing was implicated in an outbreak of VHS in England in 2006. Experimental work has demonstrated that VHS virus can persist in the tissues of fish which have recovered from infection. A **risk assessment** was carried out to examine the pathways by which VHS virus in trout carcasses imported for processing could enter the aquatic environment in England and Wales. This identified the on-farm processing of imported carcasses and the discharge of untreated effluent from processing plants direct to a water course as the most likely routes for the establishment of the virus. Risks associated with the disposal of solid waste to landfill were considered negligible. This research highlights to industry where current practices may result in disease introduction and ways in which these risks can be reduced e.g. by treatment of liquid effluent from processing plants and by sourcing carcasses for on-farm processing only from approved VHSV free areas.

<sup>13</sup> The high aquatic animal health status of the UK which restricts the availability of legal sources of fish for import combined with the large demand for common carp to stock fisheries in England has resulted in the **smuggling of fish** originating in continental Europe into the country by unscrupulous fish dealers and fishery managers. These fish present a high risk of introducing serious diseases that could jeopardise our stocks of both farmed and wild fish. In 2011 the UKBF discovered a quantity of over 200 live carp being smuggled into England in purpose built containers aboard a lorry. The Fish Health Inspectorate acting on information from UKBF took control of the consignment, seizing and destroying both the fish and the containers. The importer was subsequently prosecuted and received a substantial fine.

<sup>14</sup> To date, **research on surveillance methods** to improve our capacity for early detection of disease has focused on;

- the development of methods to rank farms based on the likelihood of disease introduction and spread (resource is focused on farms with the highest risk of disease)
- scenario tree modelling to determine the sensitivity of the different components of a surveillance system (e.g. observations by farmers and veterinarians)
- social network analysis to assess connectivity between distinct components or locations in a system (e.g. a live fish transport network)

The development of surveillance programmes has also been supported by risk mapping the UK based distribution of susceptible populations and water temperature. Ambient water temperature is a key factor controlling the distribution and impact of disease in fish populations.

<sup>15</sup> The **'Starfish' database** maintained by Cefas is the delivery tool for authorisation and registration requirements, as well as risk based surveillance. It is a valuable resource holding data covering surveillance, inspection programmes and production. A social network analysis (SNA) of these data has provided insights into the connectedness of fisheries and farms and insights into how diseases may spread and the effectiveness of control measures.

<sup>16</sup> It is a legal obligation to **report suspicion of notifiable disease** or an increase in mortality to the FHI who will investigate and take any action required to control disease. The FHI facilitates effective passive surveillance by fish farmers, fish health professionals and the Environment Agency through the provision of advice and information. Disease surveillance and sampling where appropriate of aquaculture production

---

businesses takes place on a risk based approach. This surveillance will also identify new and emerging diseases in farmed fish stocks.

<sup>17</sup> In May 2006 an outbreak of the disease of rainbow trout **viral haemorrhagic septicaemia (VHS)** occurred on a fish farm in North Yorkshire. VHS is considered to be the most serious disease of farmed rainbow trout and results in high levels of mortality in infected stocks. This was the first instance of VHS in a freshwater fish farm in the UK. Any spread from that outbreak would have presented a serious threat to the economic viability of trout farming in the country. The Fish Health Inspectorate enacted their disease contingency plan, and the affected site was rapidly isolated, destocked and disinfected. Contact testing of farms linked to the affected site, and surveillance of wild fish populations indicated that the infection was restricted to the index site. To further reduce the risk of any possibility of disease spread control measures on movements of live fish from farms in the water catchment were maintained for a further two years until the affected area was finally declared free from VHS.

<sup>18</sup> In recent years a large amount of **modelling work** has been undertaken. Cefas have developed and evaluated epidemiological models for use during a disease outbreak - to inform decisions about choice of control strategy. The current models can provide outbreak scenarios to support assessment of resources for disease control and the economic impact of outbreaks. Models of disease within-farm have been developed and will be used to assess the likelihood of downstream spread of a pathogen in the event of an outbreak.

<sup>19</sup> **Once disease is identified**, the FHI mitigate the impact of incursion through the rapid containment of an outbreak and the prevention of onward spread. This is achieved through robust statutory controls (restricting movement of aquatic animals into, out of and within affected areas) and working closely with affected aquaculture production businesses.

<sup>20</sup> FHI inspectors have worked with the ornamental fish sector to **improve biosecurity measures** plans, in particular contingency measures for the detention and isolation of fish subject to regulatory notices. The implementation of such measures by businesses provides a greater level of protection against potential losses due to introduction of disease.

<sup>21</sup> The fish parasite ***Gyrodactylus salaris*** is a major exotic disease threat to wild Atlantic salmon in the UK. GS cannot survive in sea water and the highest risk of introduction is likely to be through the movements of live fish. The FHI applies rigorous controls on the import of susceptible fish species to ensure there is no incursion of disease through this route. While the risk is considered very low the impact could be devastating - it has caused a major collapse of the salmon populations in over 40 Norwegian river systems since its introduction in the 1970's.

<sup>22</sup> Recent presentations have covered microbiological research, investigations of puffy skin and the development of contingency plans.

<sup>23</sup> **Future proofing the ornamental aquatic industry:** the Ornamental Aquatic Trade Association works to safeguard the future of the industry and wider community interests. OATA's [Code of Conduct](#) has promoted uniform welfare standards for over 20 years contributing to fish health. Comprehensive distance learning packages including fish health raise awareness of key issues in maintaining the health and well-being of aquatic animals. Their [biosecurity guidance](#) helps industry make informed decisions on where to buy fish and subsequent management to minimise the chances of either receiving or passing on disease and health problems. It includes a 'biosecurity calculator' to gain an overview of the impact biosecurity measures can have in reducing disease risk. The Primary Authority Scheme is a recent partnership with the City of London Corporation to include an inspection plan to cover pet shops, making a valuable contribution to improving animal welfare which helps prevent the spread of disease. OATA and the Reptile & Exotic Pet Trade Association produced a [Pet Code of Practice](#) – providing advice on the responsible keeping of non-native pets to owners and traders. It emphasises the 'no release of fish or plants to the wild' message, helping

---

prevent the spread of invasive non-native species, a potential risk for disease spread. The 'no release' message is printed on a million bags a year, used to carry fish home from shops.

<sup>24</sup> **Continuous early warning surveillance** needs to be maintained to enable early detection. Potential threats identified are fed into the Defra Risk Management Cycle. Initially these are raised at the Veterinary Risk Group (VRG), a cross-administration body that meets monthly to consider potential threats. The VRG provides a means of preliminary risk assessment and comments on proposed risk management options including potential further research. These are reported back to risk managers and to the Chief Veterinary Officers of the four UK administrations. Defra has recently reviewed its approach and agreed a common framework for risk assessment across all of its agencies. Aquatic animal health threats feed into the Biosecurity Risk Report which assesses and presents the risks in a consistent format when looking across the different areas to provide Ministers and decision makers with a coherent picture of all disease incursion risks.

<sup>25</sup> The **Cefas Weymouth laboratory** is recognised as a world leader in the diagnosis and characterisation of diseases of aquatic animals. The current programme undertakes pathogen characterisation and disease transmission studies using specialist state-of-the-art laboratory facilities to identify the causative agents and transmission routes for new and emerging disease.

<sup>26</sup> **Current studies** include latent virus infections in fish (KHV and eel herpesvirus) and shellfish (oyster herpesvirus) which pose problems in diagnosis and for which we need to understand the role of environmental stress in reactivation of the virus resulting in disease.

<sup>27</sup> Awareness of the emergence of a new more virulent strain of **oyster herpesvirus** in France causing large scale mortality allowed the UK to advise the industry of the risks of importing oysters from France.

<sup>28</sup> **'Puffy skin'** is an inflammatory skin condition primarily observed in farmed rainbow trout but also occasionally seen in brown trout. This new condition has emerged in the trout farming sector over recent years and is having an increasingly detrimental effect on trout production. Very little is known about the causative agent of this condition although experimental work suggests an infectious aetiology. Further research is underway at Cefas to characterise the condition, establish whether it is infectious, and study the epidemiology of the disease in order to identify means to control and eradicate or mitigate the impact on the fish farming sector.

<sup>29</sup> An interdisciplinary field that develops methods and software tools for understanding biological data, **Bioinformatics** combines computer science, statistics, mathematics, and engineering to analyse and interpret biological data.

<sup>30</sup> Provision of an efficient and cost effective **diagnostic testing service**, for example, working to European Commission or OIE standards, cuts across many levels: it provides the ability to implement regulations, to ensure preparedness for outbreaks, to deal with disease incursion as well as the ability to diagnose and assess the risk of emerging diseases.

<sup>31</sup> The data generated will improve our knowledge of fish species presence and population structure, and importantly provide information from many remote locations visited by anglers, not covered by current population surveys. This initiative will be a partnership between government and the angling community to improve fishery and fish health management.

<sup>32</sup> In May 2013 the Commission submitted the **'Smarter Rules for Safer Food'** package of proposals to the European Parliament, which aims to strengthen the enforcement of health and safety standards for the whole agri-food chain. The first proposed regulation is an update and extension of the official controls regulation, which sets out how Member States must organise and audit the official controls set out in the other subsidiary legislation. One of the subsidiary regulations is the proposed new Animal Health Regulation. The specific objectives of the Animal Health Regulation are: to establish a single, simplified regulatory

---

framework that sets out the objectives, scope and principles of regulatory intervention based on good governance and compliance with international (e.g. OIE) standards that will enable quick reaction in case of emerging diseases, ensure consistency across the field of animal health, reduce the impact of animal diseases on animal and public health, animal welfare, the economy and society as far as possible, and ensure the smooth functioning of the internal market of animals and animal products.