CRUSTACEAN COMPASSION

Code of Practice

for the Welfare of

Decapod Crustaceans in the Food Chain: from Capture to Killing

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PREAMBLE

i. Purpose and Background

The purpose of this Code of Practice is to provide a framework of good practice guidance for the treatment of decapod crustaceans used in the food chain. The intention is that the Code should support, encourage and facilitate protection of and improvement in their welfare throughout the capture-to-killing process. The aim is for the provisions to be set at a level that is stretching but achievable in commercial practice. They advocate the application of practices that place primary focus on animal welfare and they are underpinned by scientific evidence as well as taking account of practical information from industry. Where information is currently lacking, incomplete or unclear, a precautionary approach has been taken which places the emphasis on animal welfare, using best current knowledge pending further information from new scientific research and other reliable evidence sources. It is intended that the Code will be reviewed and updated periodically in order to reflect new developments and knowledge. In addition, all those with direct or indirect responsibility for the welfare of live decapod crustaceans should demonstrate commitment to continuous improvement, adapting practices in line with new knowledge and advances in technology.

Since 2022, decapod crustaceans have been recognised by UK legislation (*The Animal Welfare (Sentience) Act 2022*) as 'sentient beings'. This reflects the scientific evidence that they have the capacity to experience both positive and negative feelings including pleasure, pain and distress that matter to each individual animal. It is therefore essential that account is taken of the impact on their physical and mental welfare of all the experiences to which they are exposed throughout the capture-to-killing process. Hence, current practices need to be adapted as necessary to minimise the risk of suffering and promote good welfare.

Such an approach can bring benefits not only to the animals but also to businesses and individuals involved in the industry.

ii. Scope

The provisions of this Code cover the practices applied during the capture, on-board holding/sorting, landing, storage, transport, killing and general handling of the decapod crustacean species most commonly used for food. They do not cover in detail every element of all practices

applied at each stage. They focus on the key aspects affecting the welfare of decapod crustaceans, using available information regarding both the actual and potential impact of current practices, and how to reduce the risk of harm. Although not the main focus of this Code, the impact of current practices on certain aspects of the environment and sustainability are referred to in some cases, where these are linked to the welfare and survival of decapod crustaceans. The Code includes provisions covering practices up to and including the killing of the animals. It does not cover any aspects of treatment of products from the animals after death.

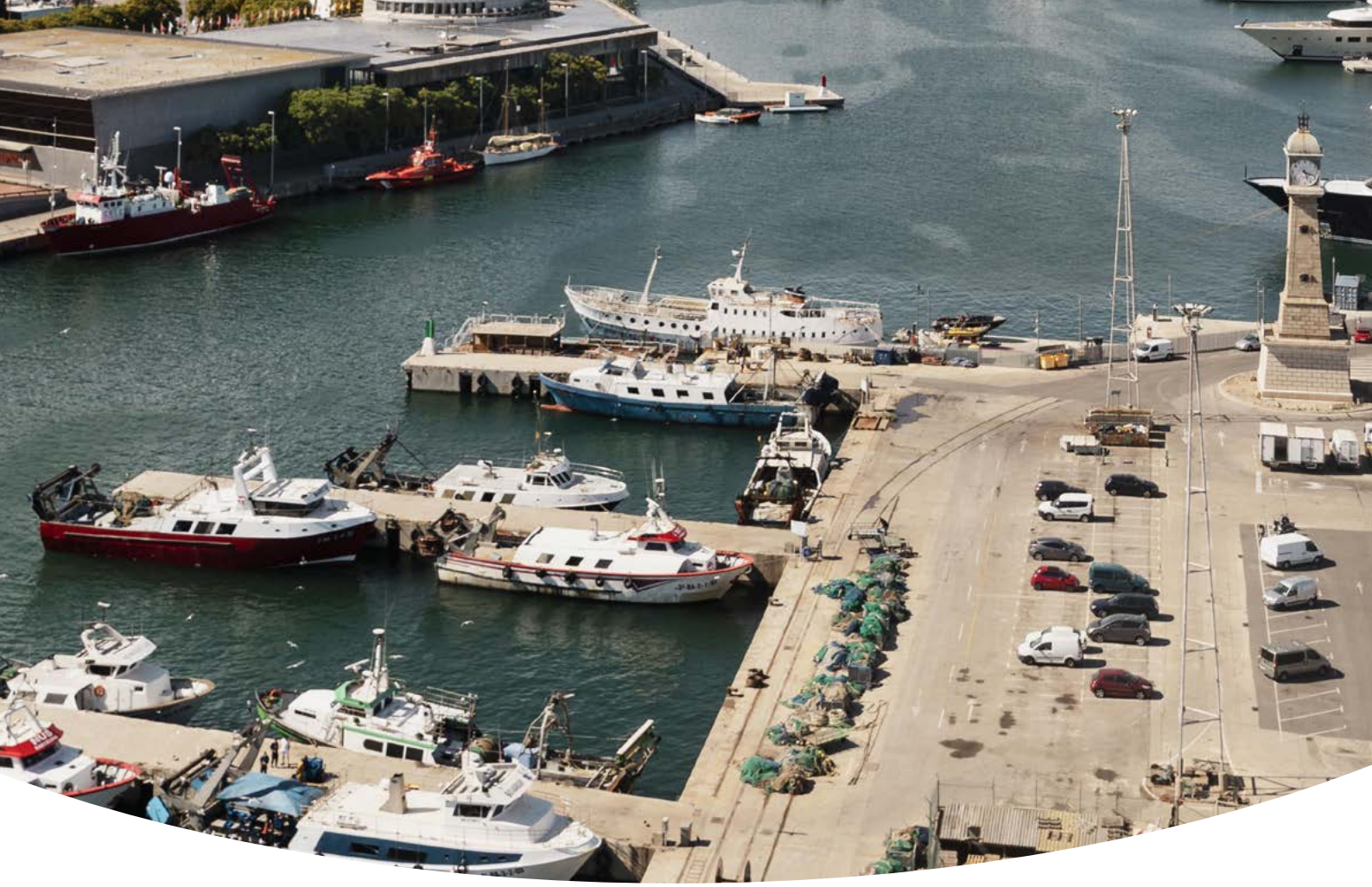
The main focus of the Code is on UK operations, so it does not include coverage of the breeding and husbandry of farmed decapod crustaceans in any detail. Nevertheless, many of the provisions are relevant to farmed species from the time following on-farm harvesting onwards. In addition, some provisions will be relevant to overseas operations relating to the treatment of imported live decapod crustaceans following – and in some cases prior to – arrival in the UK, particularly where the provisions outline general principles for the treatment of the animals.

iii. Format and use

The Code is set out in individual sections, each relating to specific stages of the capture-to- killing journey, with some (e.g. 'Handling') covering broader areas of focus that are relevant across all stages. The individual provisions within each section represent 'good practice' recommendations and should be applied in full at all times if they are to contribute to safeguarding the welfare of decapod crustaceans to an acceptable level.

Each main section includes an *Insight* section. This provides background information which aims to:

- help explain why the provisions have been set as they are – for example, by outlining key scientific and/or other information that underpins them
- provide help/advice to facilitate the effective application of the provisions.



SECTION A
Management and Training

AI Insight

i. High standards of management and care are vital to ensuring good animal welfare. Managers and all personnel working with animals need to be thoroughly trained, skilled, knowledgeable and competent in the handling and care of the species in question and have a good working knowledge of the operations in which they are involved and the animals under their care.

A2 Recommended Practices

A2.1 Managers' responsibilities – general

A2.1.1 Personnel with responsibility for the management of vessels, premises, vehicles and/or processes involving live decapod crustaceans should be named and recorded.

A2.1.2 Managers should be sufficiently knowledgeable and experienced in the practices and the species for which they have oversight to enable them to supervise, support and instruct other personnel competently, to ensure the welfare of the animals under their care.

A2.1.3 Managers should ensure they:

a) remain up to date with the latest information and innovations relating to animal welfare and technical developments, and

b) adapt practices as necessary in order to apply new knowledge to safeguard and enhance welfare

A2.1.4 Managers should maintain records of relevant data, regularly review the data and act upon the information to improve practices as necessary, including with regard to:

a) Operational data relating to the welfare and survival of animals under their responsibility

b) Training and competency assessment of personnel for whom they have responsibility.

A2.2 Procedures and Plans

A2.2.1 Managers should develop and ensure effective implementation of Standard Operating Procedures (SOPS) for all the operations under their responsibility, which prioritise, and minimise harm to, animal welfare.

A2.2.2 Managers should:

a) Develop and ensure effective implementation of Emergency Action Plans (EAP) and precautions to cope with emergencies such as fire or interruption of supplies, and

b) Provide an emergency action board sited in a prominent position that is visible to all staff and emergency services.

A2.3 Training and Competency assessment

A2.3.1 All individuals involved in the handling and care of live decapod crustaceans should be thoroughly trained to carry out the required tasks within their specific areas of duty in ways that minimise harm to live animals.

A2.3.2 Managers should develop, implement and keep records of suitable training programmes for all personnel involved in the handling and care of live decapod crustaceans, including:

a) Training in the practices and the species-specific needs and characteristics of the species relevant to their duties (see *A2.3.3* for details)

b) Regular updates, taking account of new knowledge and innovations

c) Regular opportunities for continuing professional development.

A2.3.3 The training of individuals involved in the handling and care of live decapod crustaceans should ensure that they are:

a) Aware of the particular welfare needs of the species in question and how these can best be met at all times.

b) Aware of the normal behaviour of the species in question and able to recognise signs of abnormal behaviour.

c) Aware of the specific stressors/welfare risks posed to the species in question by the practices they are applying and how to prevent, or at the very least, minimise these.

d) Able to recognise signs of common diseases in the species in question and what to do if these are identified or suspected (see *Section G: General Health and Welfare* for further recommendations).

e) Able to demonstrate competency in undertaking the tasks allocated to them in ways that minimise negative impact on the welfare of the animals

f) Able to identify when to seek expert advice and help from others regarding the welfare of the animals in their care.

A2.3.4 Managers should undertake regular monitoring and assessment of all personnel involved in the handling and care of live decapod crustaceans in order to:

a) Assess their knowledge and understanding of the issues set out in *A2.3.2*

b) Assess their competency in carrying out tasks that impact on animal welfare

c) Assess whether Standard Operating Procedures are being consistently applied

d) Identify where further training is needed to ensure the required level of understanding and competency.

SECTION B
Handling

B1 Insight

i. Decapod crustaceans are subject to multiple, varied handling experiences from capture/harvest through to the time of killing, which can have enormous impact on their welfare and survival. The nature, frequency and duration of each handling experience greatly influence the extent to which the animals' wellbeing is affected. Strong scientific evidence and practical experience indicate that good handling practices are critical to ensure good survival of decapod crustaceans.

ii. Poor practice results in many serious negative consequences, some of which can be long lasting and may result in or contribute to mortality at the time and later during storage. A number of physiological changes indicative of stress are seen in various species following exposure to physical handling. Rough or inappropriate handling can also cause injury such as internal organ, shell or limb trauma. The additional serious stressors to which the animals are often exposed at the time of handling – such as air, light, noise, temperature fluctuations and human contact – add to the overall level of physical and mental trauma likely to be experienced. In addition, the effects of multiple handling experiences during the capture-to- death journey may also be cumulative, exacerbating the negative impact overall.

iii. Refinement of handling methods and procedures to reduce negative impact and take account of species-specific considerations is therefore critical to ensuring acceptable levels of welfare. Appropriate training and competency assessment of those involved in handling decapod crustaceans commercially is also a key element in achieving good outcomes in this area.

B2 Recommended practices

B2.1 General principles

B2.1.1 All handling practices should be undertaken with care and consideration with animal welfare as a primary focus, in ways that minimise physical harm, fear and distress to decapod crustaceans. In particular, the animals should not be:

a) Grabbed, squeezed, prodded, struck or crushed
b) Thrown or tossed
c) Dropped from height
d) Held or pulled by body parts likely to be damaged.

B2.1.2 Handling practices at each stage of the capture-to-kill journey should be regularly reviewed and adapted to reduce the number, frequency and duration of handling episodes to the absolute minimum necessary.

B2.1.3 Development and application of equipment, technologies and practices that enable the capture to killing process to be undertaken in ways that avoid human contact and handling should be on-going.

B2.1.4 During handling, exposure to other stressors – including light, noise, air, fluctuating and/or inappropriate temperatures – that could have additional negative impact on the animals' welfare should be minimised.

B2.1.5 Training and competency assessment of those involved in handling decapod crustaceans should be undertaken and recorded on a regular basis to ensure good practice at all times (see – *Section A: Management and Training* for further details).

B2.1.6 Handling guidelines, Standing Operating Procedures and other instructions should be provided to those handling decapod crustaceans at any time during the capture-to-killing process, and regularly reviewed and updated to reflect the latest scientifically informed 'good practice' guidance.

B2.1.7 Procedures should be in place to ensure:

a) On-going monitoring of the welfare of decapod crustaceans during and after handling, and

b) Swift review and improvement of handling practices where these are found to result in poor welfare outcomes (see *Section G: General Health and Welfare – G2.1 Monitoring and Assessing Health and Welfare* for further information).

B2.2 Species-specific considerations

B2.2.1 Detailed species-specific guidance on handling methods, informed by scientific knowledge of the animals' biology and behaviour, should be made available to and applied by all those handling decapod crustaceans, including as part of their training programme.

B2.2.2 Handling methods and approaches should be tailored to reduce the negative impact on, and take account of considerations relevant to, individual species and stages of life.

B2.2.3 All those handling any species of decapod crustacean should be fully aware of any particular species-specific vulnerabilities and ensure that handling practices do not cause associated welfare problems.

SECTION C
Capture and onboard practices

CI Insight

i. The capture of wild decapod crustaceans exposes them to a range of very challenging experiences. These include shifts in barometric pressure, changes in salinity and temperature, physical handling, exposure to air, space restrictions, and close proximity to other animals of the same or different species. These experiences inevitably result in negative impacts on the animals' welfare, both in the short and longer term. These can include physiological, endocrinological and immunological disturbances, infections, limb loss (through autonomy), toxicity, salinity and thermal stress, hypoxia, exhaustion, physical trauma such as injury/crushing, fear/distress and death.

ii. The extent of the risk and damage to animal welfare is significantly influenced by the equipment and capture method used and the exact nature of the practices applied during capture and during/ following landing on board the fishing vessels. In addition, the health and nutritional status, stage of moult and age of the animals, as well as the season, temperature and weather at the time of capture, are all important factors influencing the extent to which the animals' welfare will be impacted.

iii. Given the many variables affecting animal welfare during capture/on-board operations, there are opportunities to reduce negative impact and improve welfare through adapting existing practices and/or replacing them with less harmful alternative approaches.

C2 Recommended Practices

C2.1 General

C2.1.1 Standarding Operating Procedures (SOP) should be developed covering all aspects of the treatment of live decapod crustaceans including:

a) Capture and hauling

b) Handling – including removal from capture equipment, sorting and grading

c) On-board holding of decapod crustaceans.

C2.1.1.1 Instruction in the SOP should form part of the training and competency assessment of all personnel involved in the capture and handling of decapod crustaceans (see also *Section A2.3 Training and Competency assessment*).

C2.2 Trawling

Background

Capture by trawling and associated on-board practices cause immense stress, physical damage and exhaustion to decapod crustaceans and generally has a greater impact on welfare than other methods (e.g. pot/trap/creel capture). The animals experience almost simultaneously occurring multiple stressors including physical exertion, abrasions, exposure to light and air (at haul-back) and changes in temperature, salinity and pressure, leading to short and longer term welfare problems and even death. The season, depth, speed and the duration of trawls and for some species, the stage of moult and gender of captured animals also influence the severity of risk and harm to welfare. Whilst it may yield larger landings, trawling tends to provide smaller individuals in poorer condition than other fishing methods, resulting in lower unit prices.

Trawl fishing also has a greater negative impact on the environment and the wellbeing of aquatic animals than other capture methods (e.g. pots/traps/creels) with bottom trawling being particularly damaging. It also results in higher levels of bycatch, including non-target decapod crustaceans and other species. The size of the mesh and the size and shape of trawl net overall – especially the codend – affects the numbers of non-target animals (i.e. undersized individuals of the target species and/or non-target species) captured, the numbers able to escape from the trawl net and the level of trauma/injury and subsequent mortality of escapees (see *C2.4 'Bycatch'* for details).

Some of the many challenges posed to decapod crustacean welfare during trawling could be reduced to some extent through adjusting equipment design, fishing and handling practices during and immediately following capture in line with 'good practice' advice from research. Application of practices shown to reduce impact at each stage could therefore improve the welfare and survivability of the target decapod crustaceans (as well as bycatch animals) and as a consequence, also bring associated commercial benefits.

C2.2.1 All those involved in trawl fishing of decapod crustaceans should aim to use alternative catching methods that have less impact on animal welfare.

> **C2.2.1.1** Where alternative methods exist for capture of the target species in question, detailed action plans, with timescales, for a move away from trawling altogether should be developed and implemented.

C2.2.2 Whilst trawling continues, it should be demonstrated that the design of the equipment/fishing gear used reflects the latest available information from research, such that during the trawl and hauling in-board ('haul-back'):

a) Harm to the target species is minimised

b) The amount of – and level of harm to – bycatch is minimised.

> **C2.2.2.1** The mesh sizes and twine diameters used for the trawling nets should be such that they maximise the escape, without injury, of both non-target animals i.e. non-target species and undersized animals of the target species.

> **C2.2.2.2** The dimensions and shape of the fishing gear should be such that they:
>
> **a)** Minimise harm to the target species during capture and haul-back
>
> **b)** Maximise the ability of captured non-target animals to escape unharmed.

C2.2.3 Trawl duration should be kept to a minimum and should not exceed 60 minutes.

C2.2.4 Trawl speed should be minimised to reduce the negative impact on animal welfare and level of bycatch.

C2.2.5 Trawl depth should be kept to the minimum possible that enables capture of the target species.

C2.2.5.1 Bottom trawling should not be undertaken.

C2.2.6 A short haul-back delay of 10-15 seconds following the end of the trawl should be implemented to facilitate escape of some bycatch species.

C2.2.7 It should be demonstrated that trawling plans take account of current knowledge regarding the season, weather/temperature and time of day that result in the best outcomes for the target species with regard to welfare and survival.

C2.3 Pots/traps/creels

Background

Several species of decapod crustacean are captured using baited pots, traps and creels designed to enable the target species to enter but not to leave the catching chamber.

Although use of pots/traps to capture decapod crustaceans tends to result in less serious welfare impact than other capture methods such as trawling, the method is still associated with various welfare challenges. The pot-caught animals are held in close confinement with conspecifics or different species for varying periods of time before retrieval, risking social stress, fighting/injury and mortality. Also, hydraulic hauling devices are increasingly used to haul larger traps, especially from deep waters. The captured animals are exposed to changes in salinity, temperature and barometric pressure during the hauling process resulting in physiological changes which increase as depths and hauling rates rise.

C2.3.1 Pots/traps/creels used to capture decapod crustaceans should be designed and utilised such that they minimise any negative impacts on welfare of the target species and other animals.

C2.3.1.1 Pots/traps/creels should be designed and operated such that:

a) The size, shape, mesh size and the design of entries and exits renders them highly specific to the intended target species/size of animals

b) They minimise harm to animals during capture and containment

c) They minimise the risk of capture of non-target species and sizes of animals

d) The ability of captured non-target animals to escape unharmed is maximised

e) They facilitate the removal of animals without risk of injury/trauma.

C2.3.2 Hauling speed should be minimised to reduce the negative impacts on animal welfare.

C2.3.3 The depths at which pots/traps/creels are placed and from which they are hauled should be kept to the minimum possible that enables capture of the target species.

C2.3.4 Regular checks should be made – and recorded – of all pots/traps/creels:

a) At least once a day

b) To remove any captured animals.

C2.3.5 It should be demonstrated that placement and hauling plans take account of current knowledge regarding the season, weather/temperature and time of day that result in the best outcomes for the target species with regard to welfare and survival.

C2.4 Bycatch

Background

Non-target decapod crustaceans and other species are often captured during trawling and in pots/traps/creels. Adaptation of the size, shape, mesh size, and the design of entries and exits of the pots renders them generally highly species-specific, reducing the volume and diversity of bycatch compared to other gear such as trawls or dredges. Nonetheless, the level of risk of capture and retention of non-target sizes and species depends on the exact design and materials used. Also, whilst the method is less environmentally damaging than trawling, pots/traps/creels can cause serious problems if lost or discarded with the risk of lost gear continuing to capture aquatic animals indiscriminately. This phenomenon, where decapod crustaceans are trapped in derelict pots and unable to escape, is known as “ghost- fishing” and can lead to the slow death through starvation of large numbers of animals, whose carcases in turn attract more animals into the pots, leading to further mortality. Each lost/discarded pot can be responsible for multiple deaths, though adjusting the design and materials used could significantly reduce this. Also, calculations indicate it would be cost effective to retrieve lost pots on an on-going basis.

C2.4.1 The design of, mesh sizes and materials used to make trawling nets and pots/traps/creels should be such that:

a) The risk of capture and holding of non-target species is minimised

b) Non-target species and sizes of animals can escape unharmed prior to removal from the water.

C2.4.2 Standard Operating Procedures should be in place to ensure that all pots/traps/creels are retrieved and removed from the water when not in use to avoid unintended capture or 'ghost fishing' and associated deaths.

C2.4.3 Monitoring of the levels and nature of bycatch should be:

a) Undertaken regularly

b) Recorded

c) Reviewed quarterly.

C2.4.3.1 It should be demonstrated that measures are in place to minimise and achieve continuous reduction in the levels of bycatch.

C2.4.4 Where non-target animals are found in trawl nets or pots/traps/creels, they should be carefully removed and immediately placed back into the sea.

C2.5 Post capture handling, sorting and associated practices

Background

After capture in pots/traps or nets and hauling on board, those decapod crustaceans that remain alive on arrival on deck experience multiple stressors. These include various handling practices during landing on deck, removal from pots/traps, release from nets, and sorting and transfer into on-board storage. The animals are also exposed to the additional concurrent challenges of exposure to air, light, noise, and fluctuating/extreme temperatures and poor weather. Whilst species differ in the extent to which they are affected, these experiences, coupled with those endured during capture and hauling, frequently result in both immediate and longer term negative impact affecting both animal welfare and commercial profitability. These include stress, fear, physiological and immunological disturbances, physical trauma/injury including limb loss, muscle necrosis, morbidity and mortality. Landing on deck is followed by often extended periods of emersion, exposure to wind chill/temperature fluctuations and light and the risk of physical trauma during removal from the pots and other post-capture handling. These experiences can result in physiological disturbances, fear, distress and injury, potentially leading to morbidity and mortality.

Some level of welfare compromise during the post capture period is inevitable due to the procedures involved. Nevertheless, the prevalence and severity can be reduced to some extent by reducing the level and duration of exposure to damaging environmental factors and by ensuring good handling practices at all times.

C2.5.1 Animals should be removed from nets or pots/traps/creels with care and consideration to prevent injury/trauma, fear and distress.

C2.5.2 Following removal from capture equipment, animals should be handled carefully and gently at all times in ways that minimise injury/trauma, fear and distress.

C2.5.2.1 The frequency and duration of handling procedures during grading/sorting of animals post capture should be kept to the minimum necessary to enable completion of the process.

C2.5.3 During the post capture period, every effort should be made to minimise – and ideally prevent – exposure of the animals to negative environmental challenges including:

a) Light
b) Noise/vibration
c) Extreme and/or fluctuating temperatures
d) Unfavourable weather conditions including rain.

C2.5.3.1 Procedures involving exposure of the animals to air during the post-capture period should be planned and implemented such that they:

a) Minimise the frequency and duration of exposure
b) Take account of species-specific differences regarding the impact of emersion on welfare.

C2.5.4 Immobilisation of the claws of large decapod crustaceans should only be undertaken as a last resort when the risk of fighting and other injurious behaviours between animals cannot be overcome through provision of appropriate holding environments.

C2.5.4.1 Alternative management practices such as physical separation of individual animals and/or reduction in stocking densities that prevent the need for claw immobilisation should be sought and applied.

C2.5.4.2 Claw banding to immobilise the claws of large decapod crustaceans should only be undertaken in line with the provisions listed in *Section G2.3 Mutilations and disablement – G2.3.2 Claw banding*.

C2.5.4.3 Claw 'nicking' to immobilise the claws of large decapod crustaceans should not be undertaken (see Section *G2.3 Mutilations and disablement – G2.3.1 Claw nicking*).

C2.5.5 Animals should be transferred into on-board holding containers as soon as possible post capture.

C2.5.6 Animals should be individually placed into holding containers and should not be:

a) Thrown/tossed

b) Dropped from a height

c) Pushed/forced into small spaces such that injury may occur.

C2.6 On-board holding

Background

The nature of the various on-board holding conditions in which decapod crustaceans that remain alive post capture are stored can have a highly significant impact on many welfare parameters and on the animals' ability to survive longer term during subsequent transport and storage. Methods of on-board holding/storage of decapod crustaceans vary considerably in nature, depending on the size of the vessel, expected holding duration on board and the species. Animals are sometimes stored in various containers in air, either individually or together, risking injurious aggressive interactions in some species (such as crabs and lobsters) due to their forced close proximity. This is often addressed by immobilising claws through banding or nicking (see: '*Section G: General Health and Welfare'* – points *G2.3.1* and *G2.3.2* for details), further affecting welfare (see above). The impact of emersion during on-board holding differs with species and duration of air exposure, which may extend to several hours or longer. There are species-specific differences in 'tolerance' to emersion but whilst some species may survive for long periods in air, the level of suffering and induction of morbidity (such as oxidative stress and inability to induce the synthesis of antioxidant enzymes or proteins) and short and longer term mortality are significant. Some species (such as Nephrops) may be held vertically in individual 'racks' (believed to mimic their burrows) whilst on board. However, research suggests they and other species benefit from a period of recovery submerged in circulating seawater tanks post capture, before the further challenges posed by onward transport following landing.

Temperature during holding/storage contributes to the impact on welfare. Keeping the animals at cool temperatures can make them easier to handle (potentially reducing trauma), reduce handling stress, and improve subsequent survival. However, too cold a temperature may lead to suffering, highlighting the importance of ensuring suitable species-specific temperature ranges at all times.

C2.6.1 On-board holding environments should cater for the species-specific needs of the animals throughout the holding period (see *Section D: Holding and Storage* for further details).

C2.6.1.1 Holding conditions should protect animals from exposure to:

a) Temperature extremes and fluctuations

b) Light

c) Noise/vibrations

d) Social stress

e) Risk of injury including crushing

f) Air – except in the circumstances outlined in *C2.5.1.6*.

C2.6.1.2 Animals should be placed into water containers to allow a period of recovery from the challenges of the capture/post capture processes.

C2.6.1.3 Where animals are held in water containers, flow-through/water circulation systems should be in place to ensure maintenance of appropriate water quality throughout the holding period.

C2.6.1.4 Water quality parameters should be monitored throughout the holding period and action taken to rectify any divergence from appropriate levels of key parameters including:

a) Oxygen

b) Salinity

c) Ammonia, nitrites and nitrates

d) pH.

C2.6.1.5 Animals should be held at temperatures at the cooler end of the species- appropriate range.

C2.6.1.6 Where on-board systems are in operation that hold animals out of water, action plans, with timescales, should be developed for replacement with water containment systems.

C2.6.1.7 Where on-board systems are in operation that hold animals out of water and on ice:

a) Animals should be separated from direct contact with the ice using materials that are suitably insulating

b) Action plans, with timelines, should be developed and implemented to replace these with in-water holding systems suitable for the species.

C2.6.2 Fishing operations should be planned such that the period of on-board holding of live decapod crustaceans is kept to a minimum.

C2.6.3 An Emergency Action Plan (EAP) should be developed to enable maintenance of animal welfare during holding in the event of an emergency (e.g. vessel breakdown).

C2.6.3.1 The EAP should be prominently displayed to ensure it can be seen by on- board personnel and emergency services, as necessary.

C2.7 Landing practices

Background

A variety of methods are used to transfer live decapod crustaceans from vessels to land, often involving the hoisting of containers filled with multiple animals from the deck to the quayside. Risks associated with this process include exposure to air, light, noise, vibration and other physical disturbances, crushing and temperature fluctuation/extremes. Such experiences risk causing fear, distress and injury and can result in serious short and long term disturbances to the animals' physiological and immunological functions. Any delay in moving the transferred animals from the landing site will add to the negative impact on welfare, increasing the risk of chronic morbidity and immediate or delayed mortality.

C2.7.1 Decapod crustaceans should be transferred from the vessel to land carefully in ways that minimise the risk of:

a) Trauma/injury, including crushing
b) Exposure to unsuitable environmental conditions
c) Exposure to physical disturbance, vibrations and noise.

C2.7.2 The timing of the transfer of decapod crustaceans to land should be planned and coordinated to minimise the time between landing and moving on to the interim or final destination.

C2.7.2.1 Animals should be transferred without delay into suitable holding environments in line with species' needs (see *Section D: Holding/ Storage* for details).

C2.7.3 Animals awaiting movement from the point of landing should be held in areas that do not them to unfavourable conditions, including:

a) Bright light
b) Extreme/fluctuating temperatures
c) Noise, physical disturbance and vibrations.

SECTION D
Holding and Storage

DI Insight

i. Decapod crustaceans experience some form of holding and/or longer term storage at various stages from the time of capture/on-farm harvesting onwards, including during pre- and post-transport periods, in transit, prior to killing/processing and while on live display in retail outlets, restaurants and live markets.

ii. The duration of storage may be short or extend to several months. The conditions in which the animals are held are hugely variable, often failing to meet basic species-specific needs. This results in exposure to many welfare risks including inappropriate and fluctuating temperature, poor water quality, exposure to air, light, noise and vibration, food deprivation/starvation, overcrowding, mixing with other species, behavioural restrictions, inability to hide and physical handling. As a result, the animals

can suffer significant stress, fear, physiological and immunological disturbances, hunger, muscle depletion, injury, morbidity and mortality. Such outcomes raise many welfare-related concerns and also impact negatively on commercial profitability.

iii. Certain holding practices, such as the displaying of live decapod crustaceans at live markets and in retailer outlets and restaurants, are not only rife with welfare and ethical concerns but are also not a necessary part of the logistics of achieving the sea-to-plate journey. Such practices therefore raise additional concerns and questions regarding justification when assessing the animal welfare credentials of commercial practices.

D2 Recommended practices

D2.1 General Principles (applicable to all holding/storage systems)

D2.1.1 Systems, infrastructure, logistics and marketing practices should be planned and implemented such that the duration of the period of holding/storage of live decapod crustaceans is kept to the absolute minimum necessary.

D2.1.2 Decapod crustaceans should not be held/stored for any period of time unless it is absolutely necessary to achieve the capture-to-killing process.

D2.1.3 All holding/storage methods and facilities should be designed, adapted and maintained such that the biological and behavioural needs of the species in question are met to the greatest extent possible.

D2.1.4 Standard Operating Procedures (SOPs) specific to the operation(s) and premises should be developed and implemented to cover all the elements outlined in *D2.1.4* – *D2.1.8* inclusive.

D2.1.5 All holding/storage systems should be designed and managed to provide:

a) Stable temperatures suitable for the species
b) Suitable water quality (during in-water storage – see D.3 below) or humidity levels (during emersion – see D.2 below) for the species
c) Protection from exposure to bright light
d) Protection from the risk of injury including crushing
e) Protection from the risk of exposure to disease
f) Protection from physical disturbance and noise
g) Opportunities to hide from other animals and humans
h) The ability to monitor key environmental parameters throughout the storage period.

D2.1.6 Stocking densities during holding/storage should be planned and managed such that:

a) There is sufficient space to allow the animals room to rest in their natural position without lying on/disturbing or being lain on/disturbed by others

b) All animals can move away from others to avoid antagonistic interactions

c) Appropriate water quality/environmental conditions can be maintained

d) The duration of holding is taken into account with greater space being provided during longer periods of storage.

D2.1.6.1 Where robust information regarding appropriate stocking densities is lacking, research should be undertaken or commissioned into optimum species-specific stocking densities:

a) For the planned duration of storage

b) That enable expression of natural movement and behaviour

c) That ensure prevention of negative welfare impacts associated with overcrowding.

D2.1.7 During holding/storage, animals should not be kept with:

a) Animals of different species

b) Animals of different sizes

c) Other animals with whom they may fight/ interact aggressively, unless provisions are in place to mitigate against this – e.g. additional space; hiding places to which animals can move.

D2.1.7.1 Claw banding during holding/storage should not be undertaken other than for short periods prior to transfer to accommodation suitable for unbanded animals.

D2.1.7.2 Where claw banding during holding/storage is currently practised, plans with timelines should be developed and implemented for new/adapted facilities that enable animals to be held safely without claw immobilisation.

D2.1.8 All those with responsibility for the care of decapod crustaceans during holding/storage should be trained and competent to undertake the tasks allotted to them such that the welfare of the animals is safeguarded (see Section *A: Management and Training* for details).

D2.1.9 A Welfare Assessment Protocol (WAP) specific to the operation(s) should be in place for the regular monitoring and assessment of the welfare, including health, of all decapod crustaceans during holding/storage (see also *Section G: General Health and Welfare – 'G2.1 Monitoring and Assessing Health and Welfare'*).

D2.1.9.1 *D2.1.7.1* The WAP should specify:

a) The frequency of monitoring

b) Species-specific welfare indicators to be monitored

c) The frequency and nature of the review of outcomes

d) The requirement to take immediate action to rectify welfare problems when they are detected

e) The requirement to identify and address without delay the causes of any problems.

D2.1.10 Emergency Action Plans should be in place to safeguard the welfare of decapod crustaceans in the event of an emergency at the holding/storage premises, including at least the following provisions:

a) Evacuation of the animals

b) Dealing with fire and flooding

c) Dealing with power outages

d) Dealing with interruption of water supplies.

D2.2 Feeding and purging

D2.2.1 General

D2.2.1.1 Decapod crustaceans held in storage should be provided with food which:

a) Is appropriate to the species

b) Maintains them in good health

c) Satisfies their nutritional needs

d) Is provided to them at regular intervals in line with species' needs – except when alternative arrangements are required by the attending veterinary surgeon.

D2.2.1.2 Food should only be withheld from decapod crustaceans during storage when the practice does not result in detriment to their welfare.

D2.2.1.3 If food is withheld for any specific purpose:

a) It should be for the minimum period necessary to achieve that purpose

b) Animals should be monitored at regular intervals throughout for signs of physical deterioration and/or distress

c) The outcome of the monitoring should be recorded and regularly reviewed

d) Animals showing signs of welfare compromise should be provided with food without delay.

D2.2.1.4 If a period of starvation results in increased levels of morbidity and/or mortality, the practices involved should be reviewed and amended to overcome any such negative outcomes.

D2.2.1.5 If food is withheld, there should be provisions in place to mitigate against the possible behavioural consequences of hunger, such as aggression and cannibalism in some species.

D2.2.1.6 If food is withheld for the purposes of purging the animals held in water tanks to remove nitrogenous waste before transportation:

a) The food should only be withheld for the minimum time necessary for adequate purging to be achieved.

b) There should be sufficient changes of water or effective flow systems in place to ensure removal of the nitrogenous waste during the purging process.

D2.2.2 Species-specific issues

D2.2.2.1 Species-specific biological and behavioural characteristics should be taken into account when planning the maximum duration of a period of withholding food such that the risk of welfare compromise is minimised.

D2.3 Holding/storage in air

D2.3.1 Exposure of decapod crustaceans to air during holding and storage should be:

a) Avoided whenever possible

b) Undertaken for the minimum duration possible.

D2.3.1.1 Where current systems involve holding/storing animals in air, plans (with timelines) should be developed and implemented to replace these with in-water holding systems suitable for the species.

D2.3.2 Where animals are held/stored in air, systems and procedures should be in place to:

a) Ensure maintenance of ambient temperature and humidity levels appropriate for the species

b) Ensure on-going monitoring and recording of temperature and humidity levels

c) Enable changes in temperature and humidity levels to be made as necessary to achieve a) above.

D2.3.2.1 Where robust information regarding appropriate humidity and temperature levels is lacking, research should be undertaken or commissioned to identify optimum species-specific levels.

D2.3.3 Plans and management practices during holding/storage in air should be in place to ensure that:

a) Mixing of different species and sizes of animals is not undertaken (see *D2.1.7*)

b) Stocking densities are maintained at levels that prevent overcrowding and associated social stress/risk of injury (see *D2.1.6*).

D2.3.4 Animals held/stored in air should be kept in environments that satisfy all the provisions listed in *D2.1.4* – *D2.1.6*.

D2.3.5 Animals held/stored in air should not be held in direct contact with ice.

D2.4 Holding/storage in water

D2.4.1 All facilities/premises holding and/or storing live decapod crustaceans in water should be designed and managed to ensure maintenance of water quality and temperature appropriate to the species.

D2.4.2 Water quality and water temperature should be regularly monitored to ensure maintenance of key parameters throughout the holding/storage period.

D2.4.2.1 All facilities/premises holding and/or storing live decapod crustaceans in water should develop and implement a water quality and temperature monitoring and maintenance protocol.

D2.4.2.2 The water quality and temperature protocol should cover at least the following elements:

a) Guidelines on appropriate levels of key water quality parameters (see *D2.4.2.4* below) for the species being stored

b) Guidelines on appropriate temperature levels for the species being stored

c) Frequency of monitoring (see below)

d) The names of personnel responsible for undertaking the monitoring

e) Recording of outcomes

f) Action plans for rectification without delay of any fluctuations of parameters beyond acceptable ranges

g) Review of recorded outcomes to identify and rectify persistent problems with water quality and/or temperature maintenance through adjustments in equipment and/or management.

D2.4.2.3 The frequency of monitoring should be at least once daily but more frequently if:

a) Any divergence from proscribed parameters is detected

b) Potential fluctuations in parameters are likely for any reason.

D2.4.2.4 The water quality and temperature protocol should include guidance on the appropriate species-specific levels that should be maintained for at least the following parameters:

a) Dissolved oxygen

b) Ammonia, nitrites and nitrates

c) Salinity

d) pH

e) Water temperature.

D2.4.2.5 Where robust information regarding appropriate water quality and temperature parameters is lacking, research should be undertaken or commissioned to identify optimum species-specific levels.

D2.4.3 Plans and management practices during holding/storage in water should be in place to ensure that:

a) Mixing of different species and sizes of animals is prevented (see *D2.1.7*)

b) Stocking densities are maintained at levels that prevent overcrowding and associated social stress/risk of injury (see *D2.1.6*).

D2.4.4 Animals held/stored in water should be kept in environments that satisfy all the provisions listed in *D2.1.4*. – *D2.1.6*.

D2.5 Holding on ice

D2.5.1 Where animals are out of water and on ice:

a) Animals should be separated from direct contact with the ice using materials that are suitably insulating

b) Action plans, with timelines, should be developed and implemented to replace this practice with in-water holding systems suitable for the species.

SECTION E
Transport

E1 Insight

i. The many millions of live decapod crustaceans who undergo transportation for commercial purposes every year experience a broad range of conditions on journeys which in some cases last several days. Every journey an animal involuntarily undertakes is stressful, necessitating robust justification for each journey, minimisation of the frequency and duration of travel, and optimisation of conditions in line with species-specific needs.

ii. Common transport practices, including those during loading, unloading and whilst in transit, expose decapod crustaceans to multiple stressors including inappropriate and/or fluctuating temperatures and other environmental conditions (e.g. water quality), often unsuitable packaging/containment, close confinement and overcrowding, stacking, exposure to air, vibrations, noise and light, and manual handling. As a result, the animals experience many physical, physiological, immunological and behavioural disturbances, inevitably causing suffering and resulting in sometimes extremely high levels of mortality both in transit and in holding facilities at the destination. Even where survival rates are high in transit, the animals may have endured many welfare problems. Survival is an inadequate indicator of wellbeing, and even in species considered by some to have a relatively higher tolerance of stress (e.g. freshwater crayfish), much suffering may be experienced in transit without death occurring. In addition, the effects of stress on live crustaceans tend to be cumulative. Hence, regardless of species, the greater the number and severity of negative experiences suffered before, during and after transportation, the greater the risk of a sustained negative impact on the animals.

iii. Decapod crustaceans are transported by road, water and air using a variety of modes of transport. Many 'good practice' principles apply in all cases, alongside specific considerations relating to the individual mode of transport. In each case, there needs to be an understanding of the particular welfare risks posed by the transport method in question if they are to be effectively addressed.

E2 Recommended Practices

E2.1 General Principles

E2.1.1 The frequency and duration of travel of live decapod crustaceans should be kept to the minimum necessary.

E2.1.1.1 Live decapod crustaceans should not be transported on journeys of longer than eight hours' duration, calculated from the first animals loaded onto the means of transport to the last animals unloaded.

E2.1.1.2 Where live animals are to undergo more than one period of travel, they should be provided with a rest and recovery period between each journey, during which they are immersed in water in line with all the conditions set out in *E2.2.1* ('Pre-transport holding and purging' section) below.

E2.1.2 Transport practices and the conditions in which live decapod crustaceans are transported should be tailored to meet species-specific needs and to optimise welfare at all times (see *E.2.2* – *E2.7* below).

E2.1.3 All personnel with responsibility for the care of decapod crustaceans during the transportation process should be trained to:

a) Undertake the tasks allocated to them competently in a way that optimises animal welfare (see *Section A: 'Management and Training' – A2.3 'Training and competency Assessment'* for further details)

b) Understand the key species-appropriate environmental conditions in which the animals should be maintained during transport

c) Understand the signs indicating poor welfare in the species being transported

d) Know what action to take if poor welfare is identified.

E2.1.4 Businesses should undertake – and record the outcome of – an annual review of current movements of live decapod crustaceans within their supply chains, including:

a) Exploration and where feasible, application of new technologies (such as those which extend the 'shelf life' of carcases and products) that reduce or prevent the need to transport live animals

b) Review of transport routes, timings, complexity and modes of transport to reduce the frequency of transfers, and the frequency and duration of travel to the minimum necessary

c) Review of the modes of transport used, to assess the need for and, where necessary, to undertake upgrading and modernisation to improve welfare during travel.

E2.1.5 Businesses should undertake a quarterly review of the animal welfare outcomes associated with individual transport operations, routes and modes of transport within their supply chains in order to:

a) Assess the mortality and morbidity rates and trends associated with each stage/operation/route

b) Identify the causes of any poor outcomes

c) Implement improvements in order to rectify poor outcomes and reduce animal suffering.

E2.1.6 Where consistently high and/or sudden increases in morbidity and/or mortality rates are associated with a particular mode of transport or trading route:

a) Operations should be suspended immediately

b) A review of the causes of the poor welfare outcomes should be undertaken and the results recorded

c) The results of the review should be used to develop improved practices and conditions that achieve better welfare outcomes

d) No further transportation/trading should be undertaken until the improved practices/conditions have been implemented.

E2.1.7 On-going research and development of transport and storage methods and adaptation of logistics to enable successful transportation of decapod crustaceans post- rather than pre-slaughter, should be prioritised.

E2.1.8 Live decapod crustaceans should never be transported:

a) Unaccompanied by trained personnel

b) In packaging that does not indicate that live animals are contained within

c) On journeys of uncertain structure and duration

d) On journeys where the nature of their treatment at the destination is unknown/uncertain.

E2.2 Pre-transport holding and purging

E2.2.1 Prior to transportation, decapod crustaceans should be immersed in water:

a) Of suitable quality and temperature for the species (see *Section D: Holding and Storage* for details)

b) For a sufficient period of time to enable effective recovery from the capture and transfer processes

c) At stocking densities that prevent social stress and physical restriction

d) In conditions that prevent exposure to light, noise and vibrations

e) In environments that provide the animals with the opportunity to hide from humans and conspecifics.

E2.2.2 Any obviously sick or injured decapod crustaceans should be removed prior to transport and humanely killed (See *Section F: Slaughter/killing* for details).

E2.2.3 Withholding food from decapod crustaceans pre-transport should only be undertaken:

a) For the purposes of purging animals to remove nitrogenous waste before transportation

b) As a last resort in the absence of transport containers with flow systems capable of removing nitrogenous waste in transit

c) For the minimum time necessary for adequate purging to be achieved in the species

d) As a temporary measure pending installation of transport container systems that enable removal of nitrogenous waste in transit.

E2.2.4 When food is withheld for the purposes of purging the animals before transportation, species-specific considerations regarding the impact of fasting on welfare should be taken into account when planning the duration of feed withdrawal.

E2.2.4.1 Morbidity and mortality levels should be monitored and the practice reviewed and amended to address any negative welfare outcomes resulting from the fasting period.

E2.2.4.2 There should be provisions in place to mitigate against the possible behavioural consequences of hunger, such as aggression and cannibalism in some species.

E2.2.4.3 There should be sufficient changes of water or effective flow systems in place in the holding tanks to ensure effective removal of the nitrogenous waste during the purging process.

E2.3 Transport – General

E2.3.1 Journey planning

E2.3.1.1 Transportation of live decapod crustaceans should be planned, coordinated and executed such that the following are kept to the absolute minimum necessary:

a) Number of transfers between modes of transport and/or transport containers
b) Frequency of travel
c) Duration of each journey.

E2.3.1.2 Personnel supervising the loading of decapod crustaceans onto the mode of transport should liaise closely with the personnel due to receive the animals at the destination in order to minimise the time the animals spend waiting on the vehicle on arrival.

E2.3.2 Plans and procedures

E2.3.2.1 An Emergency Action Plan (EAP) should be in place to safeguard the welfare of decapod crustaceans in the event of an emergency during transportation, including at least the following provisions:

a) Evacuation/transfer of the animals from the mode of transport
b) Dealing with fire on board
c) Dealing with any delays resulting in extension of the travel time
d) Dealing with loss of power, interruption of on-board electricity, air conditioning or water supplies.

E2.3.2.2 An Emergency Action Board with key information about the EAP should be placed in the mode of transport such that it is easily visible to all personnel and the emergency services.

E2.3.2.3 Standard Operating Procedures for the transportation operation should be:

a) Developed and provided to all personnel

b) Cover all operations/practices involved in the transportation process

c) Prioritise the care and welfare of the decapod crustaceans, taking account of specific-specific needs and considerations.

E2.3.2.4 All vehicles used to transport live decapod crustaceans should carry external signage indicating that live animals are on board.

E2.4 De-stressing techniques

E2.4.1 Decapod crustaceans should be held in cool temperatures prior to transport, within ranges that:

a) Facilitate recovery from the capture and transfer processes

b) Are appropriate for the species

c) Do not cause mental or physical stress or distress to the animals.

E2.4.2 Anaesthetics/in-water 'calming' medication pre-transport:

a) Should not be used unless specifically recommended by a veterinary surgeon with professional expertise in decapod crustaceans

b) Should be rendered unnecessary by ensuring transport conditions and practices minimise stress and distress to the animals.

E2.5 Packaging/containment

E2.5.1 General

E2.5.1.1 Decapod crustaceans should be transported in packaging/containers that provide a suitable environment for the species being transported throughout the expected duration of the journey.

E2.5.1.2 Animals should be placed into transport packaging/containers:

a) Individually, gently and carefully to prevent trauma and injury

b) At stocking densities that prevent the risk of crushing

c) Without stacking animals on top of each other

d) Without forcing animals into unnatural resting positions from which they cannot move.

E2.5.1.3 Animals should not be held in packaging/containers with others in ways that risk aggression/fighting and associated stress and injury.

E2.5.1.4 The duration of the time between placement of decapod crustaceans into transport containers/packaging and the loading/departure time should be minimised.

E2.5.2 Transport in water containers

E2.5.2.1 Stocking density within transport containers should not exceed levels that allow:

a) All animals to rest in their normal resting position without having to lie on, or be lain on by, other animals

b) Maintenance of appropriate water quality (see *E2.5.2.3* below).

E2.5.2.2 The water within transport containers should be monitored throughout the period of containment to assess:

a) Water quality

b) Temperature.

E2.5.2.3 Systems/equipment should be in place to ensure that water quality in transport containers is maintained within pre-determined parameters appropriate for the species being transported throughout the period of containment, including with regard to the levels of:

a) Oxygen

b) Salinity

c) Ammonia, nitrites and nitrates

d) pH.

E2.5.2.4 Any divergence from acceptable water quality and/or temperature levels should be:

a) Rectified immediately

b) Recorded and reviewed after the journey to identify and address the cause(s).

E2.5.3 Transport out of water (in air)

E2.5.3.1 Action plans, with timelines, to achieve a phase out of the practice of transporting live decapod crustaceans out of water should be developed and applied.

E2.5.3.2 Transport of decapod crustaceans out of water should only be undertaken under strictly controlled environmental conditions in which the following parameters are optimised in line with species-specific requirements:

a) Temperature

b) Humidity

c) Packaging/containment method
d) Stocking density.

E2.5.3.3 Species with low tolerance to exposure to air, including prawns and shrimps, should never be transported out of water.

E2.5.3.4 The type of packaging used should be designed to provide an environment that minimises negative impact of the welfare of the animals being transported, including the following elements:

a) Use of suitable materials that insulate against temperature fluctuations and physical disturbances/trauma
b) Appropriate species-specific design to enable animals to rest in their natural position
c) Appropriate species-specific design that enables prevention of fighting and social stress
d) Appropriate species-specific design that avoids stacking animals and prevents the risk of crushing by the packaging or other animals
e) Inclusion of elements designed to help maintain appropriate humidity/moisture levels.

E2.5.3.5 When decapod crustaceans are transported out of water, particular efforts should be made to minimise:

a) The duration of transport
b) The duration of the overall period of emersion
c) Exposure to physical disturbance.

E2.6 Loading and Unloading

E2.6.1 General

E2.6.1.1 Loading and unloading of animals onto/from the means of transport should be undertaken carefully and without haste by trained personnel in ways that minimise:

a) Physical disturbance
b) Fear/stress
c) Injury/trauma.

E2.6.2 Loading

E2.6.2.1 Animals should be loaded onto the means of transport as near as possible to the time of departure.

E2.6.2.2 Animals awaiting loading should be held in environments that prevent exposure to stressors including:

a) Light
b) Noise
c) Extreme and/or fluctuating temperatures
d) Physical disturbances.

E2.6.3 Unloading

E2.6.3.1 Decapod crustaceans should be unloaded without delay on arrival at the destination.

E2.6.3.2 Unloaded animals should be placed immediately into environments that prevent exposure to stressors including:

a) Light
b) Noise
c) Extreme and/or fluctuating temperatures
d) Physical disturbances.

E2.6.3.3 Unloaded animals who are to undergo further transportation should be given a period of recovery immersed in water before onward travel under the conditions set out in *E2.2.1* above.

E2.7 Conditions in transit

E2.7.1 Environmental conditions

E2.7.1.1 Environmental conditions experienced by decapod crustaceans throughout the transportation process should be monitored and maintained at all times at levels appropriate for safeguarding the welfare of the species being transported, including:

a) Temperature ranges – both in water (for immersed animals) and in air
b) Humidity levels – for animals transported out of water
c) Water quality – for immersed animals (see Section *E2.5 Packaging/containment* for details).

E2.7.1.2 During transport, demonstrable efforts should be made to protect decapod crustaceans from exposure to:

a) Light
b) Noise
c) Vibrations and other physical disturbances.

E2.7.2 Vehicle movement

E2.7.2.1 Road vehicles transporting live decapod crustaceans should be driven carefully and considerately to reduce physical disturbance of the animals, in particular avoiding:

a) Sharp cornering

b) Sudden braking and/or acceleration.

E2.7.2.2 Travel routes should be planned to avoid poor quality road surfaces and winding roads in order to minimise vibrations, sudden jolts and other disturbances to the animals.

SECTION F
Slaughter/Killing

F1 Insight

i. Different species of decapod crustacean live in and are adapted to a wide variety of habitats and conditions as well as differing greatly in their biology and behaviour. This significantly influences the welfare impact and ultimate efficacy of different approaches to undertaking their slaughter. A species-specific approach to selection and effective implementation of stunning/killing is therefore essential if the animals are to be dispatched as humanely as possible.

ii. Humane killing of decapod crustaceans can only be achieved if the animals are slaughtered/killed using methods that result in either instantaneous (i.e. within one second) death or instantaneous insensibility to pain and distress (i.e. stunning) which persists until death occurs. Although there are species-specific differences in outcomes, evidence indicates that this is not achieved by most of the stunning and slaughter/killing methods currently used to dispatch decapod crustaceans – including boiling (without stunning), chilling, dismemberment, gassing, freshwater 'drowning' and high salinity immersion, all of which result in sometimes severe and prolonged physical and mental suffering. Replacement of such methods with lower risk alternatives is therefore required if welfare at slaughter is to be safeguarded to an acceptable level.

iii. Even in the case of stunning and killing methods that have the potential to be swift and effective, ensuring precision, consistency and the application of appropriate parameters during implementation are of paramount importance if suffering is to be avoided. For example, electrical stunning can result in swift insensibility but only if the correct electrical parameters, appropriate to the species, are delivered for an appropriate duration. Similarly, application of certain methods of mechanical killing of large decapod crustaceans that effectively destroy all ganglia can result in relatively swift (though usually not instantaneous) death. Such methods include the 'spiking' of crabs or 'splitting' of lobsters and similarly shaped species. However, due to the need for, and skill required to achieve, highly accurate, speedy positioning and execution of the spiking/splitting, these methods are also associated with high risk of severe suffering unless undertaken skillfully and quickly. Ensuring the necessary levels of skill and competency in those undertaking these processes – and all stunning/killing methods – is therefore essential.

F2 Recommended Practices

F2.1 General Principles

F2.1.1 Decapod crustaceans should only be slaughtered/killed using methods that result in either instantaneous (i.e. within one second) death or instantaneous insensibility to pain and distress until death.

F2.1.2 The stunning and killing method used should be selected on the basis of the following criteria:

a) It is suitable for the species
b) It is suitable for the numbers of animals to be killed
c) Appropriate means of applying the method effectively and consistently are available
d) Trained and competent personnel are available to undertake the procedure.

F2.1.3 All equipment used to undertake stunning and killing should be subject to regular, recorded checking and maintenance to ensure on-going functioning and efficacy.

F2.1.4 All personnel involved in the stunning and killing of decapod crustaceans should be trained and competent to ensure that:

a) They have sufficient knowledge and understanding of the anatomy and behaviour of the species and the necessary skills to implement the procedures effectively and consistently

b) They have sufficient knowledge and understanding of the signs indicating unconsciousness and death to enable them to assess whether the animals have been rendered insensible and/or killed (see also *F2.1.6*)

c) They are aware of what action to take in the event of a stunning and/or killing method being found to be ineffective (see also *F2.1.6.2* and *F2.1.7*).

F2.1.5 Standard Operating Procedures should be in place for all stunning and killing operations, including at least:

a) The effective implementation of stunning and/or killing methods to be used

b) The name of the person(s) with overall responsibility for decisions regarding the welfare of the animals on the site/during the process

c) Action to be taken in the event of a stunning and/or killing method being found to be ineffective (see *F2.1.6.2* and *F2.1.7*).

F2.1.6 Procedures should be in place to ensure effective monitoring and assessment the effectiveness of stunning and killing methods, including:

a) Standard Operating Procedures setting out provisions for regular scheduled assessment of a designated sample of animals at the point of stunning/killing

b) Use of specified, evidence-based measures of unconsciousness and death that are suitable for the species

c) Availability of personnel who are trained and competent to undertake the assessment effectively.

F2.1.6.1 The outcomes of the monitoring/assessment operations should be recorded and reviewed to identify any concerns.

F2.1.6.2 When any concerns or divergence from the criteria set out in *F2.1.1* above are identified:

a) Immediate action should be taken to prevent further suffering of the animals (see *F2.1.7*)

b) The cause of the failure(s) should be identified and rectified without delay.

F2.1.7 Contingency plans should be in place to deal with failure of the usual, designated stunning/killing methods, including:

a) Back up equipment/methods that achieve insensibility and/or death as quickly as possible

b) Personnel who are trained and competent to implement the backup procedures.

F2.2 Stunning

F2.2.1 Decapod crustaceans should be stunned using methods that render the animals instantaneously insensible to pain and distress until death.

F2.2.2 Acceptable methods that should be used to stun decapod crustaceans are:

a) Electrical stunning – under the circumstances outlined in *F2.2.3*

b) Ice/wet chilling – under the circumstances outlined in *F2.2.5* below

F2.2.3 When electrical stunning of decapod crustaceans is undertaken:

a) Equipment specifically designed for the species in question should be used

b) Electrical parameters and duration of application that cause demonstrable, instantaneous insensibility to the species being stunned should be used (see *F2.1.6*)

c) The equipment and methodology should be in line with manufacturer's instructions, including with regard to the maximum number of animals that can be stunned at one time.

F2.2.4 The following stunning methods/practices should not be used:

a) Carbon dioxide gassing

b) Chemical anaesthetics

c) Air/dry chilling

d) Ice/wet chilling except in the circumstances outlined in *F2.2.5*.

F2.2.5 Ice/wet chilling should only be used for stunning:

a) Of small tropical species of decapod crustaceans such as tropical prawns and shrimps

b) Using temperature parameters and methodologies that result in the least delay between immersion and death

c) If there is robust species-specific evidence that the method can achieve swift, distress-free insensibility in the species in question

d) If it can be demonstrated that the method does achieve swift insensibility for the species in question (see *F2.1.6*)

e) If the salinity of the ice/iced water used is maintained at levels appropriate for the species.

F2.3 Killing

F2.3.1 Decapod crustaceans should be slaughtered/killed using methods that result in either:

a) Instantaneous (i.e. within one second) death

b) In the case of pre-stunned animals, death that precedes recovery of sensibility to pain and distress.

F2.3.2 The only acceptable methods that should be used to slaughter/kill large decapod crustaceans including crabs and lobsters (including nephrops) are:

a) Electrical stunning (see *F2.2.3*) followed by 'spiking' (see *F2.3.2.1*)

b) Electrical stunning (see *F2.2.3*) followed by 'splitting' (see *F2.3.2.2*)

c) Electrical stunning (see *F2.2.3*) followed by boiling.

F2.3.2.1 Spiking should only be used to slaughter/kill crabs if:

a) The animals have first been rendered insensible to pain and distress and do not regain consciousness prior to death

b) The animals' two main nerve centres are rapidly destroyed by spiking both ganglia from the underside of the animal

c) It is undertaken by trained, competent personnel with the skills to ensure the method is applied effectively.

F2.3.2.2 Splitting should only be used to slaughter/kill lobsters and decapod crustaceans of similar shape and anatomy if:

a) The animals have first been rendered insensible to pain and distress and do not regain consciousness prior to death

b) Effective and swift destruction is achieved of both of the nerve centres running down the central length (ventral longitudinal midline) by:

i) cutting along the midline on the underside of the animal, and

ii) spiking the first nerve centre (the supra-oesophageal ganglion) via the appropriate point through the head

c) It is undertaken by trained, competent personnel with the skills to ensure the method is applied effectively.

F2.3.3 Acceptable methods that should be used to slaughter/kill small decapod crustacean species including prawns and shrimps are:

a) Electrical stunning followed by boiling

b) Electrical stunning followed by ice water immersion

c) Ice/wet chilling – under the circumstances outlined in *F2.3.3.1*.

F2.3.3.1 Ice/wet chilling should only be used for slaughter/killing:

a) Of small tropical species of decapod crustaceans such as tropical prawns and shrimps

b) Using temperature parameters and methodologies that result in the least delay between immersion and death

c) If there is robust species-specific evidence that the method can achieve swift, distress-free insensibility, followed by death, in the species in question

d) If it can be demonstrated that the method does achieve swift insensibility, followed by cessation of central neural activity and death in the species in question (see *F2.1.6*)

e) If the salinity of the ice/iced water used is maintained at levels appropriate for the species.

F2.3.4 The following killing methods should not be used unless the animal has first been demonstrably rendered insensible to pain and distress (i.e. stunned) and remains so until dead:

a) Electrical methods

b) Boiling

c) High-Pressure Processing

d) Spiking (crabs) – see also

e) Splitting (lobsters and similar) – see also

f) Chilling – except in the circumstances outlined in *F2.3.3.1*.

F2.3.5 The following methods of slaughter/killing should never be used, even when animals have been pre-stunned, due to uncertainties and/or concerns about the potentially lengthy time taken to achieve death and/or the risk of severe suffering should animals regain unconsciousness before death:

a) Dismemberment

b) Carbon dioxide gassing

c) Freshwater 'drowning'

d) High salinity immersion.

F2.4 Emergency Killing

F2.4.1 Contingency plans should be in place for each stage of the capture-to-killing process:

a) That enable the humane emergency killing of individuals and/or groups to decapod crustaceans

b) That list the methods to be used in the event of emergency stunning/killing being necessary.

F2.4.2 Emergency killing should be undertaken in the following situations:

a) When animals are suffering from notifiable disease (see *Section G: General Health and Welfare, G2.2 Notifiable diseases*)

b) If animals are assessed as being – or likely to be – in severe pain that cannot be relieved

c) If animals are injured, ailing or distressed to such an extent that they their suffering cannot be alleviated or their condition improved.

F2.4.3 Methods of emergency stunning/killing used should aim to fulfil all the criteria set out in *F2.1.1* and *F2.1.2* as far as possible under the circumstances.

F2.4.4 All instances of emergency killing should be recorded including the following details:

a) The species and numbers of animals killed

b) The circumstances/reasons for the killing

c) The method(s) used for the killing

d) The reasons for applying the method(s) where non-recommended methods (i.e. not listed in *F2.3.2* and *F2.3.3*) are used.

SECTION G
General Health and Welfare

GI Insight

i. The multiple experiences to which decapod crustaceans are exposed during the capture/harvest to killing journey have significant impact on their welfare, including health. Given the scientific evidence and recent legal acknowledgement (in the Animal Welfare (Sentience) Act 2022) that decapod crustaceans are sentient beings with the capacity to feel pain and distress, minimisation of the risk of damage to their welfare is both an ethical and a legal obligation. Many common practices from capture onwards result in negative physical, physiological and behavioural affects which in turn cause sometimes serious and prolonged suffering. Increased levels of stress with associated immunological changes can also lead to heightened susceptibility to, and shedding of, disease which not only affects the animals themselves but also has economic and food safety implications.

ii. In addition, many decapod crustaceans are subjected to management practices involving disablement or removal of body parts. These result in physical and mental suffering which may sometimes be severe and long lasting, highlighting the need to seek alternative, less harmful approaches. In several cases, alternative approaches are already available that cause fewer welfare concerns but achieve the same desired outcomes, so switching to these would immediately reduce suffering without significant impact on management or production.

iii. If effective improvement in practices to address current welfare concerns is to be achieved, the health and welfare state of the animals needs to be monitored at each stage of the process, with contingency plans in place to address any immediate problems, and identify and address causes.

G2 Recommended Practices

G2.1 Monitoring and Assessing Health and Welfare

Background

On-going, effective monitoring of the disease status and welfare state of decapod crustaceans at each stage of the capture-to-killing process will facilitate identification of – and intervention to address – problems and causes at an early stage, benefitting both the animals and businesses. Assessment of health and welfare requires sound knowledge of normal, expected species-specific biology and behaviour. In addition, understanding of the common diseases and conditions to which the animals are susceptible, and which of these are legally notifiable, is important. Planning and implementation of appropriate procedures in the event of problems being identified is also key if welfare is to be appropriately safeguarded.

G2.1.1 Bespoke plans and procedures should be developed for monitoring the health and welfare of all decapod crustaceans at each stage of the capture-to-killing process.

G2.1.2 Health and welfare monitoring plans should include provisions that cover at least the following points:

a) A list of notifiable diseases that may affect the species in questions (see *G2.2 'Notifiable diseases'* below)

b) A list of other key health and welfare conditions likely to affect the species

c) A list – with descriptions – of key species-specific welfare (including physical and behavioural) measures to be used (see *G2.1.2* below)

d) Clear information about how to undertake assessment of the welfare measures in practice including the frequency of the assessments

e) Expected ranges/parameters for each welfare measure

f) Acceptable thresholds/ranges for each welfare measure

g) Procedures to follow in the event of thresholds being breached (see *G2.1.2*)

h) A named veterinary surgeon/practice with specialist expertise in the health and welfare of the species in question who can be contacted to provide advice.

G2.1.3 Where there are physical and/or behavioural indications that the animals are exhibiting signs of injury, discomfort or distress and/or where welfare measure thresholds are breached, immediate action should be taken to:

a) Alleviate any suffering of individuals and/or groups of animals

b) Identify the cause of the problem

c) Address the immediate cause of the problem

d) Develop and implement plans to address the cause of the problem long term to prevent recurrence.

G2.1.4 Decapod crustaceans should be humanely killed without delay, using only methods that will achieve instantaneous death or unconsciousness until death occurs (see *Section F: Slaughter/killing F2.4 Emergency Stunning/Killing*):

a) If they are assessed as being – or likely to be – in severe pain that cannot be relieved

b) If they are injured, ailing or distressed to such an extent that they their suffering cannot be alleviated/improved.

G2.1.5 Records should be made and retained of:

a) All routine welfare assessments – including names of those who undertook them and timings

b) The outcomes of all assessments

c) Actions taken to address any problems identified

d) Outcomes of the actions taken.

G2.1.6 Regular quarterly review should be undertaken of the welfare assessment records:

a) To evaluate whether overall and individual outcomes are improving, stable or worsening

b) To identify the cause of any negative trends

c) To develop and implement plans to address any negative outcomes

d) To identify areas for development such that outcomes show continuous improvement.

G2.1.7 All personnel with responsibility for handling and/or overseeing the welfare of the decapod crustaceans should be trained and competent to:

a) Apply the monitoring/assessment measures

b) Recognise the signs of clinical conditions

c) Record the outcomes of the welfare assessments (see *G2.1.5*).

G2.1.8 Where the cause of identified welfare problems is found to relate to inadequate or inappropriate operator practices, the individual(s) involved should receive appropriate additional training and competency assessment to prevent recurrence of the issues (see *Section A: Management and Training* for details).

G2.1.9 A independent unannounced welfare audit of the business should be undertaken annually by an auditor who is:

a) Independent from the direct management of the business/operation

b) Suitably knowledgeable, and qualified and/or experienced to conduct the audit.

G2.1.10 A record of the independent welfare audit should be kept showing:

a) The date of the audit

b) The name of the person who undertook the audit

c) The outcome of the audit including a list of the findings relating to each welfare measures assessed

d) The action to be taken to rectify any concerns identified without delay.

G2.2 Notifiable diseases

Background

Notifiable or 'listed' diseases in crustacea are those for which there is a legal obligation to report them to the Fish Health Inspectorate, CEFAS, even where their presence is only suspected. The diseases may be endemic (already present) or exotic (not normally present in Great Britain). Advice and a list of the relevant diseases are found in the UK government document: '*Listed disease of fish, molluscs and crustacea*' and in relevant legislation – *Commission Regulation (EC) 1251/2008 as amended by the Animals, Aquatic Animal Health, Invasive Alien Species, Plant Propagating Material and Seeds (Amendment) (EU Exit) Regulations 2020, at Chapter 2* and *Annex 1A , and Schedule 1 of The Aquatic Animal Health (England and Wales) Regulations 2009*.

G2.2.1 All those with responsibility for decapod crustaceans from the time of capture onwards should:

a) Be aware of the notifiable disease that can affect the species under their care

b) Be familiar with the signs and symptoms of notifiable diseases in the species under their care

c) Have plans in place to address suspected notifiable disease situations including containment of the outbreak and alleviation of any associated suffering (see: *G2.1.3* and *G2.1.4*).

G2.2.2 Businesses and/or individuals who see or suspect any indications that decapod crustaceans may be suffering from a notifiable disease *must* (i.e. by law) report this immediately to the *Fish Health Inspectorate* at CEFAS.

G2.2.3 Biosecurity plans specific to the premises and/or operations should be developed and implemented at each stage to reduce the risk of diseases being introduced into the population of captive decapod crustaceans, including:

a) At any premises where animals are being sorted/graded and packed

b) During live transportation

c) At any premises where animals are being held/stored.

G2.2.4 Biosecurity provisions should include at least the following:

a) Provisions for the isolation from other animals of individuals or groups of animals suspected of being diseased

b) Plans for prevention of introduction of diseases into holding/storage systems

c) Routine cleaning/disinfection protocols for cleansing of all equipment and areas between batches of animals.

G2.3 Mutilations and disablement

Background

There is clear evidence that mutilation of live sentient animals undoubtedly causes pain and distress. Similarly, immobilisation of parts of the body such as claws causes distress, prevents natural movement and behaviour and can lead to tissue damage.

Nevertheless, many decapod crustaceans are subjected to procedures that either remove or disable specific body parts for ease of management/containment or for increasing productivity in aquaculture. See also: *MUTILATIONS | Crustacean Compassion*.

G2.3.1 Claw nicking

The claws of large decapod crustaceans are often disabled after capture for ease of management, by fracturing of the apodemes[1] and cutting of tendons in the dactyls[2] of the claws. This results in pain, fear, an open wound, increased susceptibility to infection, reduced resilience to the stressors experienced during handling, packing and transport and increased risk of mortality. It also leads to reduction in the quality

1 Apodemes are folds or flanges derived from the cuticle of arthropods, that extend inwards from the exoskeleton and form the attachment point for the muscles

2 Dactyls are the moving part of the claw that form the final segment.

of – and higher levels of necrosis in – claw muscle so there are negative commercial implications in addition to the welfare harms.

G2.3.1.1 Claw nicking of live decapod crustaceans should not be undertaken at any time for any purpose.

G2.3.1.2 Alternative practices that do not cause pain and injury but achieve necessary management of decapod crustaceans (such that fighting and other injurious behaviours between animals are prevented) should be sought and applied as necessary.

G2.3.2 Claw banding

Use of bands to immobilise claws in large species such as crabs and lobsters is commonly undertaken post capture for ease of management. It is less invasive and stressful than claw nicking, but is still highly restrictive and prevents expression of natural behaviour. Long term banding causes muscle atrophy, inhibits behaviour and can distort or weaken claws in moulting animals.

G2.3.2.1 Claw banding of decapod crustaceans should only be undertaken:

a) For the purposes of preventing fighting and potential injurious behaviours between animals

b) Pending development and application of more humane methods of preventing such injurious behaviours.

G2.3.2.2 Alternative management practices, such as physical separation of individual animals, that overcome the need for claw banding should be sought and applied.

G2.3.2.3 Where claw banding is undertaken:

a) Bands should only be left on the animals for the minimum time necessary

b) Bands should not be so tight that they cause injury/damage to claws.

G2.3.3 Claw removal

Manual removal – as opposed to natural autonomy – of the claws of large decapod crustaceans is sometimes undertaken and the animals returned to the sea. It is mistakenly believed that such action mimics natural claw loss (autonomy) and that the animals returned to sea will recover and regrow a replacement claw. However, manual claw removal causes stress responses, open wounds and impairment of important behaviours (including feeding and self-protection) resulting in suffering and poor survival outcomes.

G2.3.3.1 Removal of claws from live decapod crustaceans should not be undertaken at any time for any purpose.

G2.3.4 Tail removal (’tailing’)

The separation of the tail from the abdomen of decapod crustaceans (known as ‘tailing’) is sometimes undertaken on live animals at the time of slaughter/processing. This is highly likely to cause severe pain and distress. [See: *Section F: ‘Slaughter/ Killing’* for details and recommendations].

G2.3.4.1 Removal of the tail (‘Tailing’) from live decapod crustaceans should not be undertaken at any time for any purpose.

G2.3.5 Tail notching

Tail notching: Tail- (or V-) notching is a fishery management practice widely used to delay fishing mortality of berried female lobsters to enable them to breed successfully and protect stocks. A V-notch is made by removing a small triangular piece from one uropod (a tail section) after capture before returning the animal to the sea. The notched animals are designated illegal for landing and/or commercial sale until such time as the V-notch has been reduced to a certain size. Whilst undertaken for conservation purposes, the removal of tissue from live lobsters leads to risk of pain and distress. It may also increase susceptibility to disease, lower resilience to environmental stressors and increased mortality.

G2.3.5.1 Tail notching of decapod crustaceans should only be undertaken for the purposes of identifying breeding berried females so that they are returned to the sea and not used in the food chain.

G2.3.5.2 Where tail notching is undertaken:

a) Handling of animals should be kept to the minimum necessary to undertake the procedure

b) Handling should be undertaken carefully and gently

c) Only clean, sharp implements used specifically for the purpose of notching should be utilised

d) The notch should be the minimum depth/size necessary to enable effective identification of the animal.

G2.3.5.3 Alternative approaches to preserving the lives of berried females that do not involve mutilation and associated pain, distress and risk of infection should be developed and applied.

G2.3.6 Eyestalk ablation

The destruction (or ablation) of the eyestalks of prawn/shrimp species in aquaculture is commonly used to try to increase the fecundity of breeding females through the impact on a complex of glands in the eyestalks. Regardless of the method used, the practice is associated with serious short and long term harms. And there are doubts about its true efficacy. Also, non-invasive alternative options for enhancing production are available.

G2.3.6.1 Eyestalk ablation of live decapod crustaceans should not be undertaken at any time for any purpose.

G2.3.6.2 Alternative approaches to increasing fecundity/productivity should only be applied if:

a) It can be demonstrated that increased productivity of individual animals does not result in any additional welfare problems

b) If the method used does not cause pain, distress and suffering to the animals.

APPENDIX A

- Crustacean Compassion Animal Welfare Policies and Position and Position Statements *WELFARE POLICIES & POSITION STATEMENTS | Crustacean Compassion*
- Crustacean Compassion Animal Welfare Report [publication date 11th July 2023]
- Crustacean Industry Welfare Hub *Crustacean Industry Welfare Hub*
- The Snapshot: Industry Benchmark on Decapod Crustacean Welfare *THE SNAPSHOT | Crustacean Compassion*
- Review of the evidence of sentience in cephalopod molluscs and decapod crustaceans. Birch, J., Burn, C., Schnell, A., Browning, H., & Crump, A., 2021. Department of Philosophy, Logic and Scientific Method, London School of Economics and Political Science. Commissioned and funded by Defra. *https://www.lse.ac.uk/business/consulting/assets/documents/Sentience-in- Cephalopod-Molluscs-and-Decapod-Crustaceans-Final-Report-November-2021.pdf*
- Animal Welfare (Sentience) Act 2022. UK Public General Acts. *Animal Welfare (Sentience) Act 2022 (legislation.gov.uk)*
- Listed diseases of fish, molluscs and crustacea and their status. *Listed diseases of fish, molluscs and crustacea and their status – GOV.UK (www.gov.uk)*
- *Seafood Innovation Fund* – Useful Projects: *Phage-based shelf-life extension of langoustines (FS155) – Seafood Innovation Fund*

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