

Case Scenario Template

Case author: Janice Lloyd

Scenario Theme: Aquatic Animals

Scenario Topic: Aquaculture and fish welfare

Name of client: Aquaculture Industry

Age, sex, species/breed of patient(s): Cultured fish

Patient's problem(s): Potential for negative events to give rise to suffering

Case ILO objectives: B1.1; B1.3; B1.4; B1.6; B1.8; C1.1; C1.10; C1.15; C1.19

AW / Ethical challenges: Husbandry / QoL - Applying the Five Freedoms to improve the husbandry of intensively farmed fish

References:

Ashley, P. J. (2007). Fish welfare: current issues in aquaculture, *Applied Animal Behaviour Science*, 104(3-4), 199-235.
Southgate, P., & Wall, T. (2001). Welfare of farmed fish at slaughter. *In Practice*, 23(5), 277-284.

Background Information

Fish farming has grown rapidly world-wide over the past 20-30 years. As the population in Australia and around the world grows, so too does the demand for sustainably sourced seafood. Australia's demand for seafood currently exceeds the supply from domestic production and continues to grow.

As with any animal production system, productivity and good carcass quality are linked to good standards of welfare. Thus, the growth of the aquaculture industry, which accounts for roughly a quarter of global fish production, has led to an increased need for improving husbandry and management practices of farmed fish.

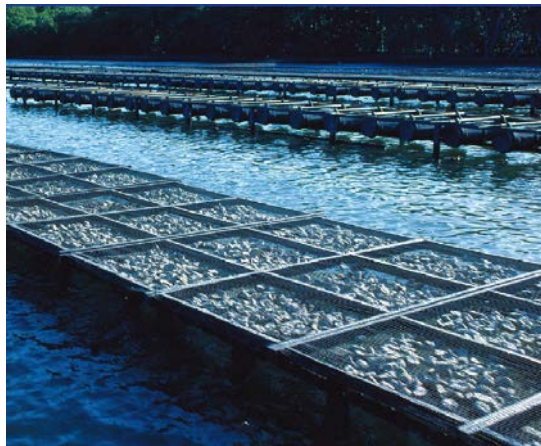


Image credit: Best practice framework of regulatory arrangements for aquaculture in Australia, DAFF

Background Information

The relatively small size of the cerebral hemispheres in fish has been used historically to support the argument that fish do not feel pain to the same extent as higher vertebrates. However, similarities in the structure of the nervous system and the sophisticated ability of fish to respond to aversive stimuli belie this theory. It is now widely accepted that fish are sentient animals that can experience pain and suffering; thus there is an ethical obligation to treat fish humanely. This has significant impacts for the treatment of fish used for commercial purposes, as well as for fish kept as companion animals and for recreational fishing.

Scenario

You have a keen interest in becoming a 'fish vet' once you graduate as a veterinarian. To further your knowledge in this area you undertake an external placement as part of your veterinary studies on a large, commercial fish farm.

As part of the placement requirements, you are required to write a report on the welfare issues you encounter during the placement, and to suggest changes to legislation or procedures to alleviate the situation.

You recognise that although there are substantial differences between terrestrial and aquatic farming, the Five Freedoms, which form a logical framework to assess and improve farm animal welfare, can be applied to fish farming systems. Oh if only you had paid more attention to your Welfare and Ethics lectures, you lament 😊, but decide to go ahead and structure your assignment around this area.

Background Information

The welfare of an animal includes its physical and mental state, hence good animal welfare implies both fitness and a sense of well-being.

The UK's Farm Animal Welfare Council proposed the Five Freedoms in 1992, using the recommendations from an earlier government enquiry known as the Brambell Committee (1965). The Freedoms are:

1. *Freedom from hunger and thirst:* by ready access to fresh water and a diet to maintain full health and vigour.
2. *Freedom from discomfort:* by providing an appropriate environment including shelter and a comfortable resting area.
3. *Freedom from pain, injury or disease:* by prevention through rapid diagnosis and treatment.
4. *Freedom to express normal behaviour:* by providing sufficient space, proper facilities and company of the animal's own kind.
5. *Freedom from fear and distress:* by ensuring conditions and treatment which avoid mental suffering.

Instructions to students

Task:

Name some of the specific challenges that are encountered in aquatic farming.

Describe how the Five Freedoms might be applied to lessen the impact of intensive farming procedures on fish welfare.

The Five Freedoms are ideal states that are often difficult to achieve. Discuss why applying the Five Freedoms can lead to problems.

Assessment:

You will receive a mark out of **xx** for your answer.

Model Answer

- There are specific challenges of aquatic farming that reflect the biology of the species being farmed:

The nature of aquaculture requires high standards of management and stockmanship to minimise the adverse economic effects of stress and disease.

Being ectothermic, the body temperature of fish tracks the ambient water temperature, which can pose problems if outwith the optimal range of tolerance.

As fish live in a watery environment they are in close contact with pathogens, toxins and metabolic waste products.

‘Three-dimensional farming’: Observation of fish stock presents different challenges to that of farmed terrestrial animals. It may be difficult to monitor the deeper levels of the environment – underwater cameras may be necessary for adequate monitoring of the three-dimensional environment.

- Applying the 'Five-Freedoms' to fish farming systems:
 - **Freedom from hunger and thirst:** Farmed fish are usually fed on a daily basis, and care should be taken to avoid changes to this regime as this could be detrimental to welfare. However, fish are often deprived of food prior to some management/slaughter procedures (designed to reduce physiological stress during the procedure) – some for many days or even weeks. The Farm Animal Welfare Council (FAWC) and the Humane Slaughter Association (HAS) recommend that salmon not be deprived of food for more than 72 hours and up to 48 hours for trout, and not for any other reason such as adjustment of body composition. Care should be taken not to dehydrate fish when introducing fish not adapted to a hyperosmotic marine environment, such as salmon smolts, in sea water. A period of adjustment in brackish water may be necessary.
 - **Freedom from discomfort:** To provide a comfortable environment, care should be taken regarding: water flow rates; water quality (e.g., keeping cage nets clean); cages should be deep enough to allow fish to escape from adverse surface conditions; and shade from the sun should be provided. Care should also be taken regarding selection of the cage site, as adverse weather conditions and/or fast water currents can cause external damage or exhaustion.

- **Freedom from pain, injury or disease:** Fish are sentient animals that can experience pain and suffering, and thus there is an ethical obligation to treat fish humanely. Care should be taken with any husbandry practice involving handling, grading and netting due to the potential to cause skin damage, ulceration and the loss of the protective mucus layer. Intensively farmed fish are susceptible to a range of pathogens (parasitic, bacterial and viral) that cause high levels of morbidity and mortality. Disease control in farmed fish is challenging. Reliable diagnostic tests are limited and few licensed medications are available. However, good stockmanship is imperative to diagnose disease and treat appropriately.
- **Freedom to express normal behaviour:** Stocking densities and confinement are of concern in aquaculture, and the inability to express natural behaviours, such as migration, may cause suffering. The current tendency in intensive systems is towards higher stocking densities. While sufficiently high densities may be required to reduce territorial behaviour and decrease aggression, too high a stocking density results in poor water quality, an increase in fin and skin damage, poor growth and disease.
- **Freedom from fear and distress:** There is much potential to cause fear and distress in farmed fish, which can affect whole populations as well as individual animals. Factors inducing fear and distress include handling, transport, food deprivation, crowding, removing fish from the water and the process of slaughter. In addition, fish must be protected from predators such as seals and diving birds on sea farms, and birds and other predators on land-based farms. Knowledge of the effects of these stressors on physiology should be applied to make species specific recommendations for best practice.

- Problems achieving the Five Freedoms:

The Five Freedoms are ideal states that are extremely difficult to achieve. In farming, as in the wild, it is impossible to fully provide the Five Freedoms at all times. It may even be undesirable to satisfy them all, as the 'naturalness' of an animal's behaviour may not correlate with good welfare. For example, some natural behaviours are shown in response to adverse conditions such as predator avoidance. Additionally, some Freedoms may conflict. Examples include: being free of disease sometimes requires treatment and restraint/handling, which can induce fear and distress; and allowing an animal to express normal behaviour will inevitably cause distress on certain occasions during 'normal' social interactions.

Compromise is inevitable. However, when one of the Freedoms is compromised (e.g. during handling or during normal social interactions) this can have short-term and long-term negative effects on an animal's welfare.

Variations on this scenario

Additional Task:

Describe the principle welfare considerations relating to farmed fish production in the period leading up to, and at the time of slaughter.

What changes to legislation or procedures would you suggest to alleviate the situation?

Model Answer (skeleton):

- Stress
 - Selective breeding of stress-resistant strains.
 - Dietary supplements to reduce stress.
 - Altering handling, stocking and management regimes.
- Aquaculture practices compromising fish welfare
 - Handling and transport – overcrowding/exposure to air.
 - Food deprivation.
- Slaughter
 - Asphyxiation in an ice slurry; immersion in CO₂-saturated water; ‘de-sliming’ of eels in salt and liquid ammonia in a dry tank; and live-chilling/freezing in cold brine vs electrical and percussion stunning.

- Fish behaviour
 - Preventing aggressive behaviour.
 - Social hierarchies; competition for food; stocking densities; feeding regimes; large, dominant individuals; dark substrates in tanks.

Reference: Ashley, P. J. (2007). Fish welfare: current issues in aquaculture, *Applied Animal Behaviour Science*, 104(3-4), 199-235.